

THE SUPPLEMENT
TO THE
UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE INFORMATION OF

THE HOSPITAL CORPS
OF THE NAVY

ISSUED BY

THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT

DIVISION OF PUBLICATIONS

CAPTAIN J. S. TAYLOR, MEDICAL CORPS, UNITED STATES NAVY
IN CHARGE

EDITED BY

LIEUTENANT COMMANDER H. H. LANE, MEDICAL CORPS
UNITED STATES NAVY

JULY, 1919
(NUMBER 10)



WASHINGTON
GOVERNMENT PRINTING OFFICE

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NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

(2)



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PREFACE.

From the first issue of the United States Naval Medical Bulletin it has been intended as a vehicle of communication with the Hospital Corps, and to be the means of imparting information and instruction to it as well as to the Medical Corps of the Navy. The recent expansion and improvement of the Hospital Corps seems now to justify more direct methods, and the material prepared for that body will hereafter be issued in the form of a SUPPLEMENT.¹

Contributions for the SUPPLEMENT are desired from members of the Hospital Corps and from other sources, but the Bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General United States Navy.

¹The present issue is No. 10. Nos. 1 and 2 appeared incorporated in the July and October issues, 1917, respectively, of the United States Naval Medical Bulletin.

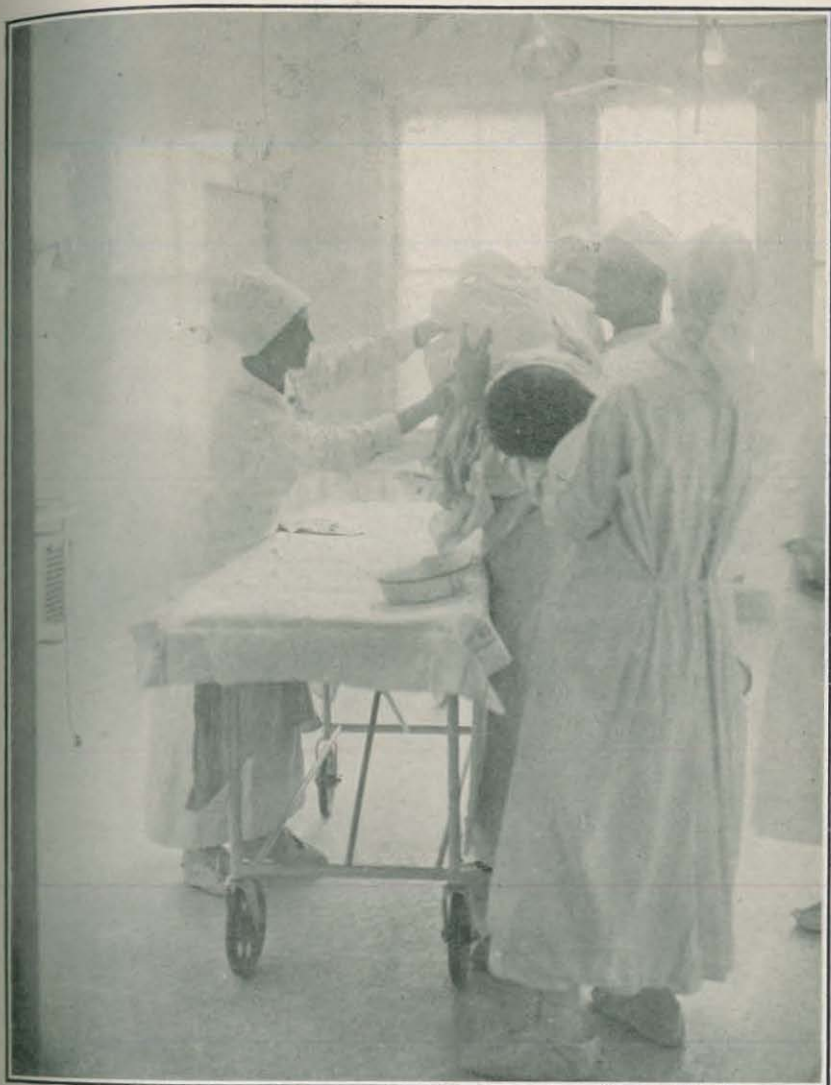
PREFACE

The first issue of the United States Naval Medical Bulletin was intended as a vehicle of communication with the Hospital Corps, and to be the means of imparting information and instruction to it as well as to the Medical Corps of the Navy. The Bulletin and improvement of the Hospital Corps were the main objects of the Bulletin, and the material prepared for the Bulletin was gathered in the form of a SUPPLEMENT. The Bulletin for the SUPPLEMENT are derived from members of the Hospital Corps and from other sources, but the Bureau does not undertake to endorse all views and opinions expressed.

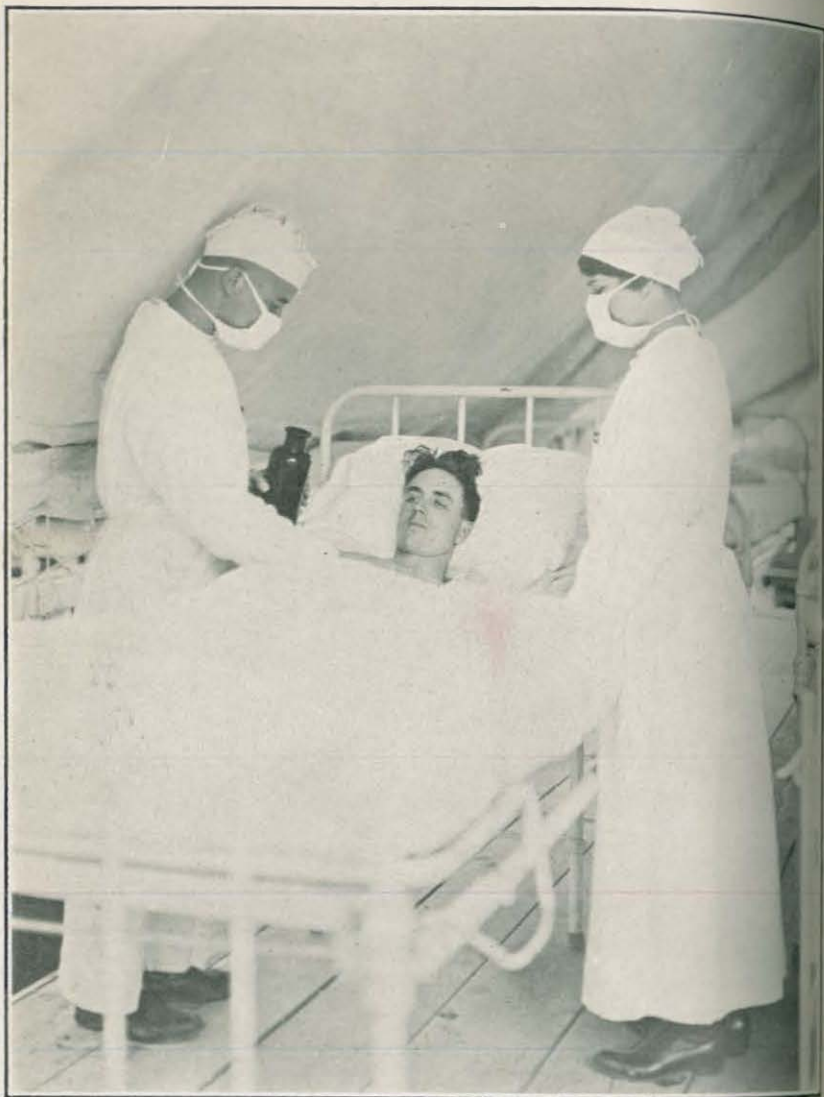
W. C. HARRIS.

W. C. HARRIS,
Surgeon General United States Navy.

The Bulletin is No. 10, Vol. 1 and 2, published respectively in the fall and spring of 1901, respectively, of the United States Naval Medical Bulletin.



Teamwork in the operating room.



Instruction at the bedside.

THE HOSPITAL CORPSMAN AND THE TRAINED NURSE.

By J. S. TAYLOR, Captain, Medical Corps, United States Navy.

No one can hope to make through the printed page a suggestion of vital usefulness unless he can count on the reader to approach the topic discussed with an open mind; unless the reader is prepared to admit facts which are proved to be true; unless the reader will accept whatever argument has merit and will respond to appeals made to the best motives and principles of conduct.

More than 15 years ago, when the establishment of a corps of trained female nurses was contemplated for the Navy, a discussion took place in my hearing and the speakers aired their opinions somewhat after this manner:

"The moment you put women in our hospitals they will monopolize the cream of the service and all the dirty work will go to the hospital corpsmen."

"Yes; and if the hospital corpsmen come back after hard service at sea to find they are to play scrubber and charwoman, the Hospital Corps will be ruined and broken up."

"It would be a splendid thing to have these trained nurses in our shore hospitals, but would they be worth the price if they killed the Hospital Corps, since we can not get along without it at sea? After all, going to sea is the principal function of the Navy, and we must have our sick afloat looked after."

"Well, why not give each medical director in charge of a hospital a fund from which to draw when he had a serious case that demanded special nursing? He could telephone to the near-by town and get a trained nurse, and when the case was terminated by death or discharge she could pack up her duds and depart."

"That would work as long as there was not a run on nurses. In case of an epidemic, nurses might be hard to get. They'd have to be signed on in some way so as to have a definite number always available, and really a regular corps as part of the outfit would be a better system, if we've got to have them."

"Well, there's no question about it; we do need a few women on hand all the time. I should vote first of all for a matron who would run the linen room and effect huge savings in that department. She would have a roving commission to cruise in all the wards and keep the boys up to the mark in tidiness and neatness. She'd improve their manners, too, all without any lecturing or scolding. A woman

has a wonderfully elevating influence that way. Then, there should be a woman to supervise the diet kitchen and all special diets."

"In that case you'd better stick in another for operating-room work. The moment we get a good steward trained for that job the bureau detaches him. They might leave a trained nurse there long enough to build up a definite routine and technique."

"Well, I see the finish of the Hospital Corps if the scheme goes through."

These views did not stay the march of events, as we now know. In time the trained nurses were due to arrive, and, as I realized there was a strong undercurrent of feeling on the subject, I got my hospital corpsmen together and tried to summarize the situation thus:

"Whether you like it or not, the trained nurses are here and here to stay, so the question now is how to face the situation. Some of you have announced that you did not come into the Navy to be bossed by women. Being bossed by anybody, anywhere, is never in the scheme of a man's ambition, but it's a large part of his life everywhere just the same, and as long as he is bossed by somebody who is better than he is in the particular work he is doing he can not reasonably complain. There's a lot handed out to you in the Navy that you did not bargain for, so don't begin by turning on the newcomers, the women. Play the game. Do your work up to the limit and don't be ashamed to learn from anybody who knows more than you do.

"I am for the Hospital Corps, first, last, and all the time, and I don't want to see you imposed on, but I do not want to hear you squeal either. Necessity knows no law. The entrance of trained nurses into the Navy represents a demand for better nursing than the Hospital Corps has given in the past; it is a short cut to better nursing. The fault may have been with the naval organization rather than with the hospital corpsmen as individuals. The facilities for your training and development may have been inadequate, the organization of your corps defective. The laws regulating promotions, ratings, pay may not have provided opportunity or incentive adequate for the requirements. On the other hand, when it comes to actual nursing a man is as far behind a woman as a percheron is outclassed by a blooded 2-year-old on the race track. You know this. You know that when a fellow is seriously ill he calls for his mother or sister, not for father or brother, to take care of him.

"Taken all in all you are a good lot, and many times when I have read the riot act to you or roundly called you down I was wrong to do so, because I had expected impossibilities of you. There are some things a male biped can not do. He can not fix up a tempting tray which will coax a patient without any appetite to eat heartily, and he can not carry that tray up two flights of stairs and then serve the

patient without slopping the broth into the saucer or getting the coffee on the napkin. He can not rearrange the pillows and make the fever patient feel and look comfortable as a woman can. He has not that sense of the fitness of things which makes it impossible for him to enjoy an afternoon off if he has forgotten to take out the soiled dressings or has neglected some other detail of duty to his charge. The masculine creature is always a bit rough and uncouth as a nurse—I am; you are; all of us are. We can not change our spots, but we can hide them. Let us unite to learn all we can from the new accessions to the hospital staff. We can work harmoniously if we take as our motto, 'The best for the patient every time, cost what it may.'"

I was in charge of the medical service, and it was my good fortune to have assigned to my wards two excellent women, whose tact, intelligence, and industry helped very much to smooth out the difficulties of the novel situation. They said little, and they did a great deal. They had been used to hard work, and they continued to work even after getting into the Navy, declining to regard it as a comfortable berth for the weary. (A good many people of both sexes after they enter the service concentrate their efforts on the single task of making good without doing any real work. Some economize energy by not sweeping in the corners, some by giving the broom to the other party.)

I recall, too, a most active little person assigned to the surgical service who imparted a certain smoothness and briskness to the work of that branch. Indeed, there was more or less improvement all along the line, and the appearance of the place was conspicuously bettered. The curious gray fluff that grows like a mold under beds died out. There were many finger nails polished, many a chin was shaved daily that had not been so blessed before.

The years have flown since then, and to-day we can survey our present status and see how far ominous prophecies and gloomy forebodings have been fulfilled.

In the first place, whatever of deserved praise or criticism has been earned by the Navy Nurse Corps (Female), it has not displaced or disrupted the Hospital Corps, which was never in more flourishing condition or more useful, more absolutely indispensable to the naval service than it is to-day. Legislation enacted prior to the war has at last removed the invidious distinctions which placed it at a disadvantage with respect to other ratings in the matter of pay, promotions, and privileges, and has so increased and readjusted the various grades as to greatly enlarge the opportunities and rewards for good men.

The war has publicly demonstrated the value of the Hospital Corps. Individually and collectively the work of its members in camp and

trench, on battleship and transport has been commended. The public has learned about the Hospital Corps of the Navy, which now has such a reputation to sustain as it never had before.

In the next place, it is clear that the Navy Nurse Corps has also come to stay. Its usefulness has been amply proved, and in the Navy hospital, as in the civilian hospital, the female nurse has a permanent place. It is not necessary to go into details. Ask anyone familiar with our hospitals of 20 years ago how they compared in general appearance with those of to-day, and ask any officer or man who was a patient then and has been again more recently about the neatness and cheerfulness of his room, the daintiness of his food tray, the general aspect of the wards, the corridors, etc.

When it comes to a consideration of the relation between these two bodies it is clear that there is, as in any contact of human beings whose work is different in nature though associated in purpose, a possibility of misunderstanding and friction. For the best interests of each and for the greatest good to a common cause, harmony and cooperation are essential. How may it be secured? For organizations, as for individuals, the best promoter of harmony is a full appreciation of one's own limitations and of the others' good qualities.

The hospital corpsman, when called in to wring a swab, empty a bucket, or scrub a deck, should not feel that he is playing the servant. That is the narrow view of the small man. He should realize, on the contrary, that all service is worthy and that everyone who gets anywhere in a legitimate way has had to serve an apprenticeship.

The trained nurse had her grueling experience as probationer in a training school, then worked for long hours in a civil hospital at the beck and call of exacting patients, doctors, superintendent, closely confined, enjoying little relaxation, regulated by a discipline as strict and unyielding as that of any military service. The period of private nursing furnished different but equally hard experiences. When finally she came to the naval hospital she perhaps looked upon the hospital corpsman as inexperienced and untrained so far as nursing goes, as young men about on a par with what she herself was in the days of the training school, 3, 5, or 10 years before. Now nobody likes to be a novice and still less to be treated as one, but a novice is a novice, a freshman is a freshman, an undergraduate is not an alumnus, a student is not a professor. The hospital corpsman should develop a spirit of humility in the hospital ward. He should realize the limitations of his youth and sex. He should appreciate from the start that a rating badge is one thing and proficiency in the art of nursing quite another. For example, does he possess an exquisite sympathy, a sensitiveness to fine shades of feeling and behavior; does he read physiognomy; has long practice taught him to perceive a change for

the better or worse in a patient before he has taken pulse or temperature? Does he recognize the subtle signs of fatigue or discouragement before the patient has complained? Has he learned to sleep with one eye open ready to jump at the first uneasy movement of his patient, to arise at a mere sigh of the sufferer? Has he acquired that manual dexterity born in part of sensitiveness to the suffering of others which enables him to pass a catheter or introduce a syringe or give a hypodermic without the patient's flinching with apprehension before he has even taken the first step? Delicacy of touch, silent steps, deft movements, speed without haste, efficiency without officiousness, solicitude without persecution, the apt word on occasion, or golden silence—these things are the part of nursing that can not be learned out of a book or from lectures. Some of them may be painfully acquired by a man here and there, but they are born in the majority of women.

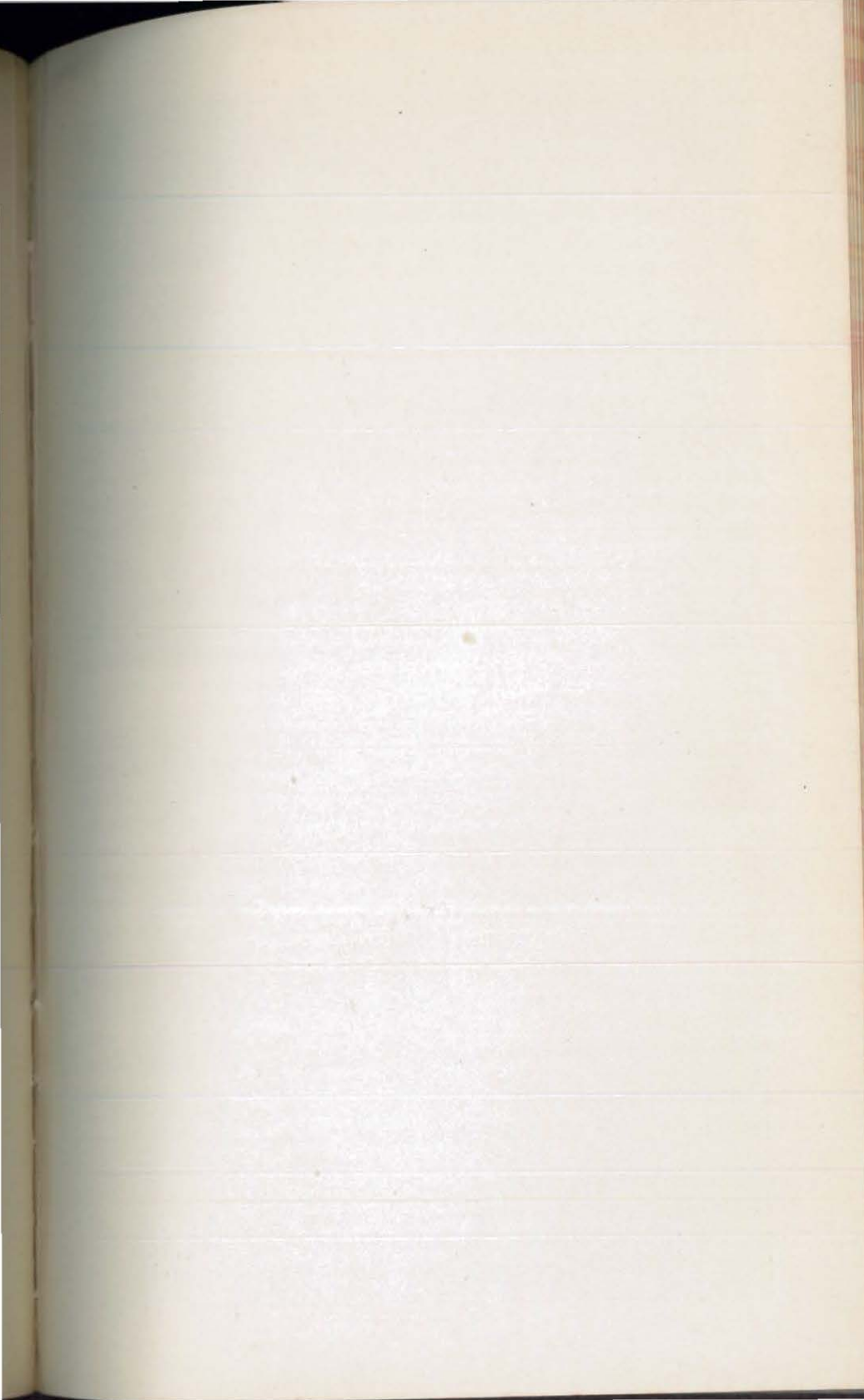
On the other hand, a certain train of reflection may with propriety be suggested to the female nurse. She should realize that in spite of her superiority in many things there are avenues of service absolutely closed to her in which the hospital corpsman must play a part and is her superior because he has not her limitations. Why is the hospital corpsman dear to the heart of the doctor? It is because, when shore duty is over and he exchanges the pleasant life on *terra firma* for cruising, it is the hospital corpsman who goes with him to share the trials and dangers of the sea. It is the hospital corpsman who helps to hoist a fireman with a broken head up from the depths below, who gives the anesthetic or passes instruments in the stuffy operating room of a rolling ship. Together they toss in an open boat on the way to assist the tramp ship that has signaled a request for medical aid. Together they toil in a hot compartment reeking with the fumes of formaldehyde to prepare a shipmate's body for the last journey home. When the seas are breaking over the forecastle and all the ventilators are down they work shoulder to shoulder in the sick bay. The hospital corpsman shellacs the storeroom in the double bottoms, and, bent double, gets things shipshape there on the eve of leaving port. He prepared the requisition for stores and then got a cart and a gang of men from the deck and went to the general storekeeper for the stores, brought them aboard and put them away. At general quarters, at collision drill, at battle efficiency inspection, through all the routine of military life the doctor and the hospital corpsman are intimately associated through good or evil repute, making or marring together the reputation of the medical department of the ships.

To the hospital corpsman who has had charge of the sick bay dispensary, or operating room of a battleship, there naturally comes

a sense of disappointment and chagrin when on getting ashore he finds himself relegated to some minor service, the responsibility and credit of which goes to another. He knows, and the doctor knows, that the Hospital Corps is not all raw recruit, and he is perhaps sensitive about his position and quick to feel a slight. He sees, or thinks he sees, a difference between the behavior toward him of the nurse who is new to the service and of the one who has been in six months or a year. The new nurse is simple, unaffected, a fellow worker, a willing worker without an exalted sense of dignity and more concerned with discharging her own duty than on exacting service and consideration from others.

For perfect harmony, or the nearest approach thereto humanly possible, as there are always everywhere one or two individuals born to make trouble, each must give and take. The hospital corpsman must realize to the full how wide is woman's sphere, how indispensable her deftness, her gentleness, her fineness of perceptions; he must learn enough about nursing to be able to perceive what an art it is and how long and tedious are the steps by which the art is acquired, and he must realize when doing some humble and distasteful job that the woman in white went through an identical apprenticeship in her day. He must be filled with ambition to acquire, in addition to his clerical skill and his knowledge of practical ship details, as much of the art of nursing as possible so as to render at sea the most efficient service possible to officers and men when they are sick or wounded. Once fired with enthusiasm in this purpose he will eagerly apprentice himself to his nursing superior and disregard trifles calculated only to wound the susceptibilities of one less interested in getting along. "I will learn from anybody who can teach me," is a useful motto. The sulking attitude, "I'm as good as anybody else," never gets a person ahead, and in time the world brands him as distinctly less good than everybody else. The hospital corpsman must love his work and be primarily concerned with delivering the goods. With that thought uppermost his position will take care of itself.

To the trained nurse we make a respectful appeal to abide by old standards, to remember that talent, knowledge, ability of any kind entails responsibility. Never let thoughts of creature comfort, ease, or reward, wean you from ideals. You doubtless became a nurse primarily as a means of livelihood, but at the same time you selected that particular career because the nobility, the usefulness of it appealed to you more strongly than some other life work that had equal remuneration of one kind or another. Do not allow yourself, through inertia or specious arguments and representations, to occupy a place you do not fill. Do not drift into merely bossing a job as long as





Working together.



Leadership in ward.

something more is needed. The best way to teach is by example. By so much as you feel yourself possessed of a superiority of technical attainments by that much does it become your bounden duty to bring others up to your level.

Do not drive but lead. A simple illustration will suffice for the whole range of your duty. If you are teaching two lads the proper way to prepare a patient's bed, there are two ways to go about it. One is to tell them how the job is done and then set them at it together while you stand by and correct their mistakes. There is a slightly more tedious way which gives infinitely better results because there is a moral principle behind it, an idea which converts a mechanical and didactic act into a living force. You may take these lads one at a time. While the lad holds to one end of the draw sheet you have the other end. Then you repeat the performance with the other pupil. The difference between these two methods is enormous. Until you think and ponder over this trifling performance in its two aspects their full significance does not appear. One is the method of lecture, the other of demonstration. One is theory, dictated, the other is collaboration. The boys who work with you and with whom you work are very differently affected from those whom you merely put to work.

There is a great deal for the hospital corpsman to do besides nursing. But there is a great deal besides nursing for the trained nurse to do. She comes into the service with definite accomplishments and attainments representing the 5 or 10 talents of the Savior's parable. It is not enough to go through the routine duties of the institution to which she is assigned. She, like every other human being, has a call to something higher than the performance of the minimum requirements. She must double the talents committed to her. The moment that a Navy trained nurse conceives that the hospital corpsman is below par, that he lacks the knowledge and training which seem to her essential for the full and adequate nursing of the sick, she should at once and from that very judgment have the vision of moment that a Navy trained nurse conceives that the hospital corpsman is the only available source of nursing for the sick of the sea-going personnel. The trained nurse may not function afloat, but she can have the ambition to train and develop the hospital corpsman so that he may approximate to and replace her in that field. What a worthy ambition that! What room for patience, tact, endeavor in such a work!

What an inspiration to help lies in the idea of thus extending the benefits of her training and ability to those whom she can never serve and benefit in person but only by proxy.

The mission of the trained nurse in the Navy, her prerogative, her duty is to nurse the sick. If she is shut out by reason of her sex from

some part of the field where there are sick that need her, then she must provide a substitute. This single conception of duty and privilege carried into every detail of her daily walk and conversation will of itself make for harmony and mutual understanding with the hospital corpsman. Just as on his part a high conception of duty and the ambition to discharge his obligations to his shipmates afloat in the fullest and worthiest way will make the hospital corpsman a willing and apt pupil in the trying and laborious period of hospital training.

The real Navy is afloat, and the hospital corpsman should be proud to think that his true field of work is with the men on the fighting ships. His hospital experiences are to perfect his performance of duty where the need is greatest and the work to be done a man's work. Let him not begrudge the expenditure of a little elbow grease from his strong masculine right arm in return for the finishing touches which the female nurse can contribute to his training. Thus working together, combining deftness and strength, intelligence and fine perceptions, technical and practical training, the two corps can establish and maintain a Navy standard of hospital efficiency that no civilian organization can rival.

LAND HO! THE ORIENT.

By L. ZEMBSCH, Lieutenant, Medical Corps, United States Navy.

The gray fog bank was hanging over the Farrallones, but it was not too gray to screen off entirely the golden rays of the setting California sun. In the distance Mount Tamalpais, crested with gilt, overlooked Alcatraz and Angel Islands and beautiful San Francisco. Many of us hardly noticed the splendid sight as we skimmed over the green seas with our nose pointed westward through the Golden Gate, bound for new and unknown adventures.

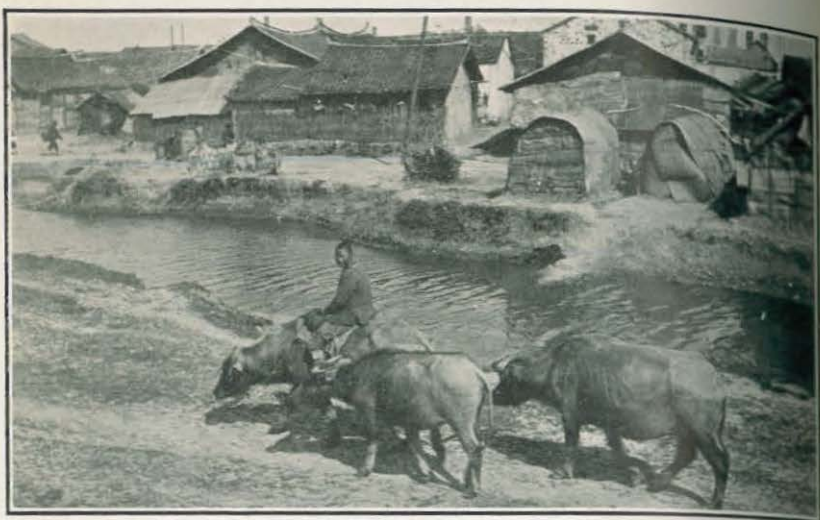
It had been just two weeks since we had returned from Nicaragua. All hands had been given a 72-hour liberty, and this, together with the regular liberties and the bright lights of Powell, Market, and O'Farrell Streets had kindly relieved us of our three months' savings. But what cared we for a few paltry savings; it was worth them all. By this time our minds were highly stimulated by the circulation of scuttle butt rumors of an extended oriental cruise. Officially we knew we were going to Honolulu, but from there on—that was the question. Who would be so lucky as to have an opportunity to visit that wonderful country with its cherry blossoms, its dainty maidens, and picturesque snow-capped Fujiyama that we had all seen hundreds of times on tinted postals and in Japanese art. And to think of seeing old mysterious China—well, that was hardly conceivable to the best of our dreamers!



Tea house at Shanghai, China.



View of Fujiyama, Japan.



Water buffalo used for draft, in China.



Draining a marsh by treadwheel, Hankow, China.

The bracing salt air and the warm breezes blowing landward with the tide tended but to enhance the stimulus produced by the possibilities of such a cruise. Visions of oriental cities stretched before our minds; passing maidens in their gala silks, softly gliding in and out among the temples; dusky girls with ukeleles sitting beneath the sheltering palms. Such were our reveries. Scents of sandalwood and the intoxicating fragrance of tropical verdure were in our nostrils.

We were just 24 hours on our way when the predictions of an interesting voyage were proving out. A number of accommodating black whales, spouting like geysers, blew themselves most heartily for our benefit, and, as some one expressed it, showed that they had water on the brain. Porpoises had been with us almost from the start, playing leap frog and running us races in which they were easily the victors.

The afternoon of the fifth day we rounded Diamond Head and steamed into the beautiful city of Honolulu, correctly named the "Paradise of the Pacific." There she lay in all her tropical glory. We had gone right up and made fast to the pier just two blocks from the main part of the city, where a band playing "Aloha Nui" received us.

This place is surely the hospital corpsmen's delight. Here the health of the ship's company is always 100 per cent. No one has time to get ill, and sick call becomes merely a matter of five-minute routine. Liberty is given every day at 1 o'clock, good until 8 the following morning, and then "forty-eights" on Saturday. My, what a time! Waikiki Beach, with its resorts, the Royal Hawaiian Band, dusky maidens to sing and dance, the Pali in all its wonders, the motor drive to Haliewa—it was all like a dream, and when the crew capped it off by a dance on Young's Roof Garden and our ship steamed out next morning for Guam we could hardly realize that what happened was all real.

We stopped just a few hours in Guam and then headed straight for the Philippines, the land of dopey dreams, where the stores close at 12 noon and open again at 2 p. m., where all hands take their siesta after the noonday meal and promenade in the evening on the Luneta to the strains of the Constabulary Band, soothed by the cool, gentle monsoons from the China Sea. We bought our souvenirs on the Escolta with the aid of our cochero (driver), who insisted on "first aid" at the bargain counter. I bought pieces of jusi and piña cloth for waists, several Manila hats, and a pair of highly colored easy slippers for use in the sick bay. Clark's and such other places that dispensed cold, palatable beverages, together with the *carromatos* (carriages) seemed to gather in most of our spare change while here. We made several trips through the old walled city, visited Spanish cathedrals

built in the sixteenth century, and indulged in several very appetizing Spanish meals. Target practice was held in Manila Bay and, after another liberty, we shoved off for China.

Four days later we dropped anchor at Woosung, which is just a short run from Shanghai. Here everybody had a good view of old and new China and an opportunity to lay in a most wonderful assortment of silk and Swatow drawn work for the ones at home at ridiculously low prices.

To see the Chinaman in his own home town was a novelty to most of us. No less of a novelty were the Sing Song girls and fan-tan parlors and the sampans and Chinese junks in the harbor. The Europeanized part of the city has in it everything you would meet at home, and in addition the common carrier, the 'rikisha. I procured one in Frenchtown, and though the coolie spoke French and I only English, we got along beautifully out there in China—I with my hands and he with his feet. We visited temples with their tinkling bells, where great big pearls were sold by lily girls with tiny shoes and coal-black hair. Their tight-fitting jackets and loose black trousers made rather an odd picture as smilingly they beckoned us to buy jade, and of course we all bought their souvenirs. The next day we were carried in sedan chairs by four coolies, who charged 2 Mex., being about 90 cents in our money. They cheated us about 25 cents at that, so I afterwards learned, but they are welcome to it.

The Province of Kiaochow, in northern China, was our next port of call. At that time it was a German concession. Since then it has been taken by the plucky Japs. The outstanding feature and the one that impressed us most here was the fact that all the Chinese spoke German. Well, why not? Here at home they all speak English, but nevertheless it was rather peculiar to us, and I remember well the very first thing the jinrikisha man said to me was, "Vollen see nach die brauerei gehen?" (Do you wish to go to the brewery?), and of course we all did. What would be the use of visiting a German concession unless you did?

The arrival and stay in Yokohama was no less wonderful, though somewhat of a different character. We spent about two weeks here, which gave everyone sufficient time for a run to Tokio, the fifth largest city in the world and quite modern along its principal thoroughfare. Many of us visited the large department store, where you check your shoes at the door and put on white socks before entering to buy your best girl that beautiful kimono. Though not like Marshall Field's in size and variety, it is nevertheless one of the prettiest places one can enter. The miniature show cases, the heavily padded matting on which you tread, the thousand and one colors and designs of silks displayed dazzle you and make you think of an absinthe fiend's dream.



Funeral procession of Yuan Shi Kai, the first President of China.



River boats, Shanghai, China.



River front at Canton, China.



Old Chinese bridge.

The hundreds of soft shuffling, shy girls who bow and bow and are too polite to wait on you until you have been properly seated and upholstered are certainly interesting. Both Yokohama and Tokio have marvelous places to see, and I don't believe we overlooked one. Some of us even took the trip to Kamakura to see that "Great god made of mud," called Dhaibutsu, and with the consent of the guardian of his majesty, we promptly committed the sacriligious act of climbing up into his hand and having our picture taken. Our jinrikisha man gently reprimanded us for this, but we heeded not and merely looked for more secret places in which to delve.

We left for home, stopping again at Honolulu and making a trip to Hilo, where all hands were given a chance to visit Kilauea, the largest active volcano in the world. This was a most impressive sight and one which vividly portrays Dante's Inferno. Two weeks later we glided back into the Golden Gate with a collection of experiences which we would not exchange for the rarest of metals.

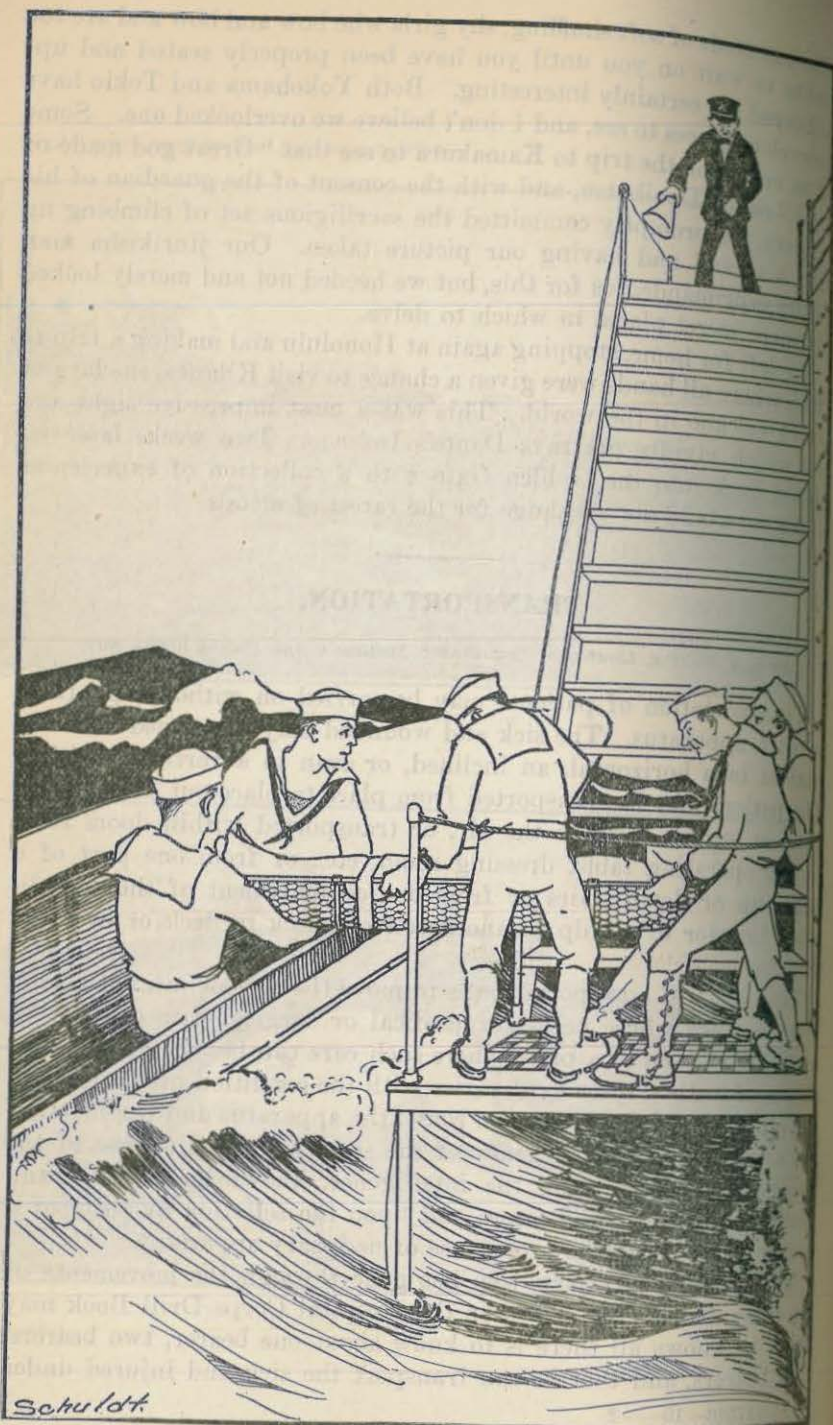
TRANSPORTATION.

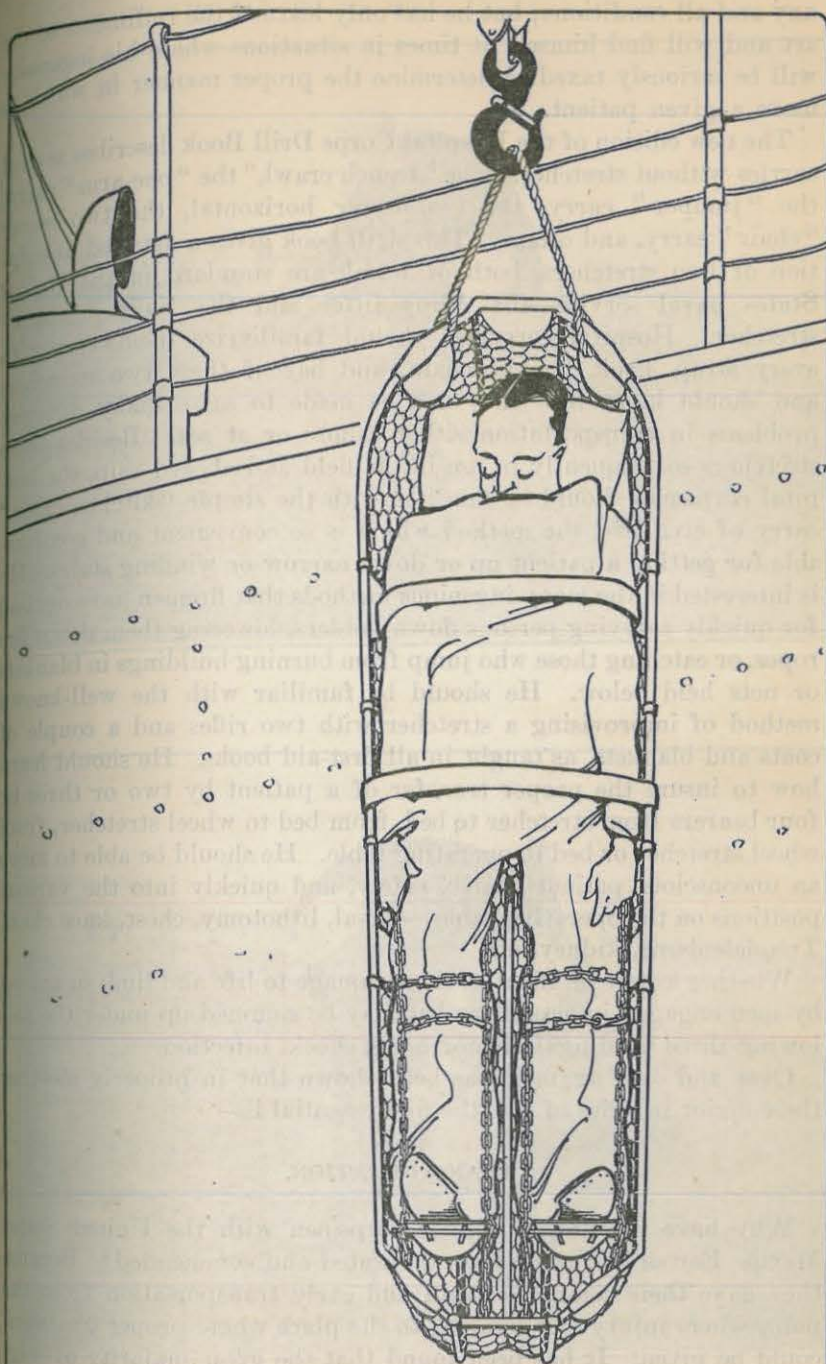
By G. F. COTTLE, Lieutenant Commander, Medical Corps, United States Navy.

Transportation of patients may be carried on without apparatus or with apparatus. The sick and wounded may be carried with the patient in a horizontal, an inclined, or even in a vertical position. The patient may be transported from place to place out of doors, on land, at sea, or through the air, or transported within doors from bed to operating table, dressing room, etc., or from one part of a house up or down stairs or from one compartment of the complicated interior of a ship to another, from deck to deck or over the side.

The object of transportation is to move the sick or injured person from a place where necessary medical or surgical care can not be adequately given to a place where such care can best be given. The choice of method to be used varies with the condition of the patient, the obstacles to be overcome en route, the apparatus and persons that are available, and the urgency of the situation. The success of the procedure depends upon the intelligence, knowledge, ability, and resourcefulness of the bearers and upon the selection by them of a proper method and the proper use of necessary apparatus.

The hospital corpsman who has gone through the movements of the litter drill as prescribed in the Hospital Corps Drill Book may think he knows all there is to know about one bearer, two bearers, four bearers, and that he can transport the sick and injured under





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any and all conditions; but he has only learned the rudiments of the art and will find himself at times in situations where his ingenuity will be seriously taxed to determine the proper manner in which to move a given patient.

The new edition of the Hospital Corps Drill Book describes several carries without stretchers—the “trench crawl,” the “one-arm” carry, the “jumper” carry, the two-bearer horizontal, the two-bearer “chair” carry, and others. This drill book gives a detailed description of two stretchers, both of which are standard in the United States naval service—the Army litter and the Navy “Stokes” stretcher. Hospital corpsmen should familiarize themselves with every strap, hook, buckle, chain, and bar of these two stretchers and should know how they can be made to solve many different problems in transportation either ashore or at sea. Besides these stretchers so frequently in use in the field and aboard ship, the hospital corpsman should be familiar with the simple “kitchen-chair” carry of civil life, the method which is so convenient and comfortable for getting a patient up or down narrow or winding stairs. He is interested in the many ingenious methods that firemen have devised for quickly carrying persons down ladders, lowering them down fire ropes, or catching those who jump from burning buildings in blankets or nets held below. He should be familiar with the well-known method of improvising a stretcher with two rifles and a couple of coats and blankets, as taught in all first-aid books. He should learn how to insure the proper transfer of a patient by two or three or four bearers from stretcher to bed, from bed to wheel stretcher, from wheel stretcher or bed to operating table. He should be able to move an unconscious patient gently, safely, and quickly into the various positions on the operating table—dorsal, lithotomy, chest, knee chest, Trendelenburg, kidney, etc.

Whether ashore or afloat, serious damage to life and limb sustained by men engaged in actual combat may be summed up under the following three headings: Hemorrhage, shock, infection.

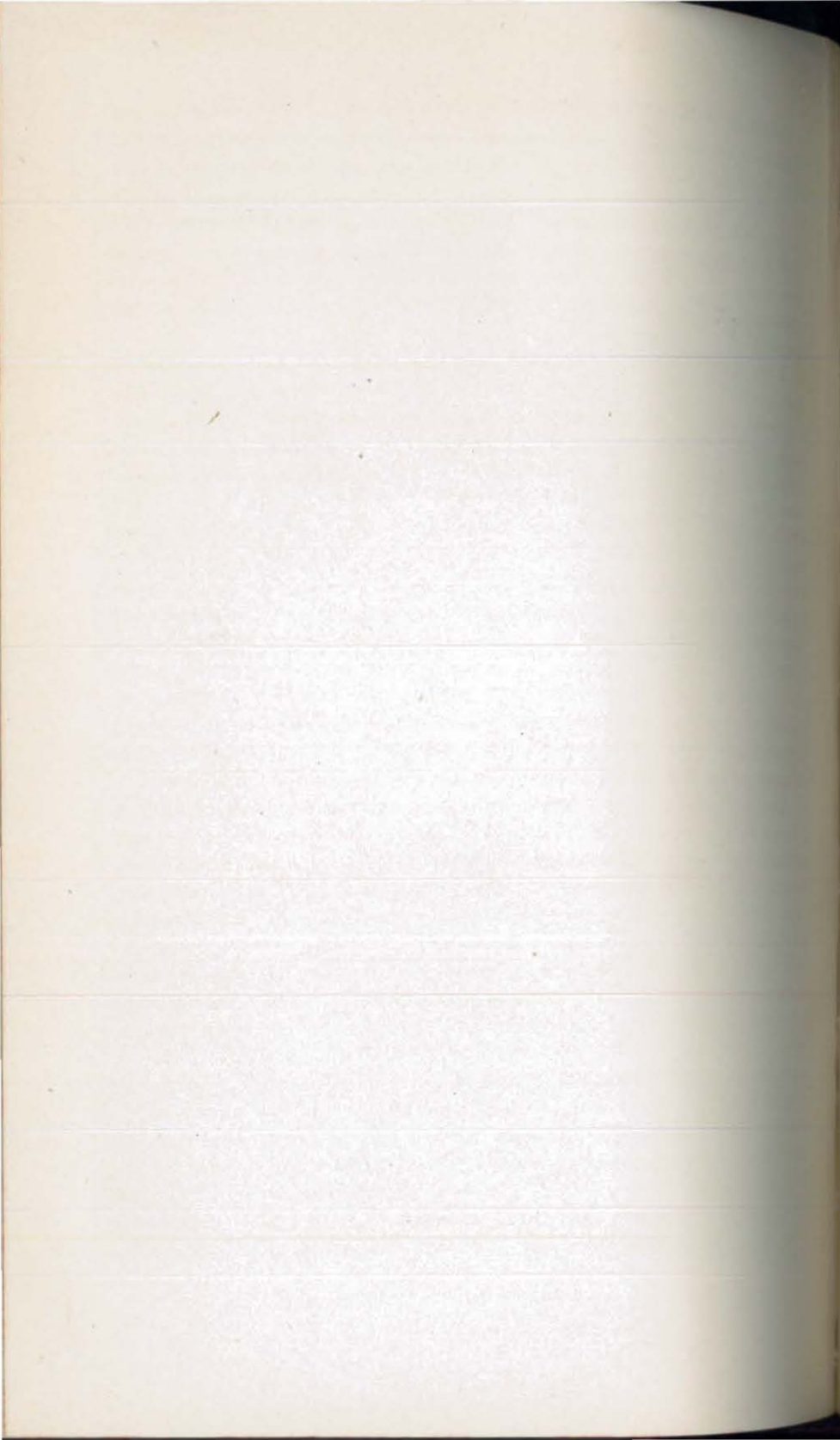
Over and over again it has been shown that in properly meeting these major injuries of war the first essential is—

TRANSPORTATION.

Why have the naval hospital corpsmen with the United States Marine Forces in France been decorated and commended? Because they gave their comrades rapid and early transportation from the point where injury was received to the place where proper treatment could be given. It has been found that the great majority of war-time wound infections will recover if early, rapid, careful transportation to proper treatment is provided.



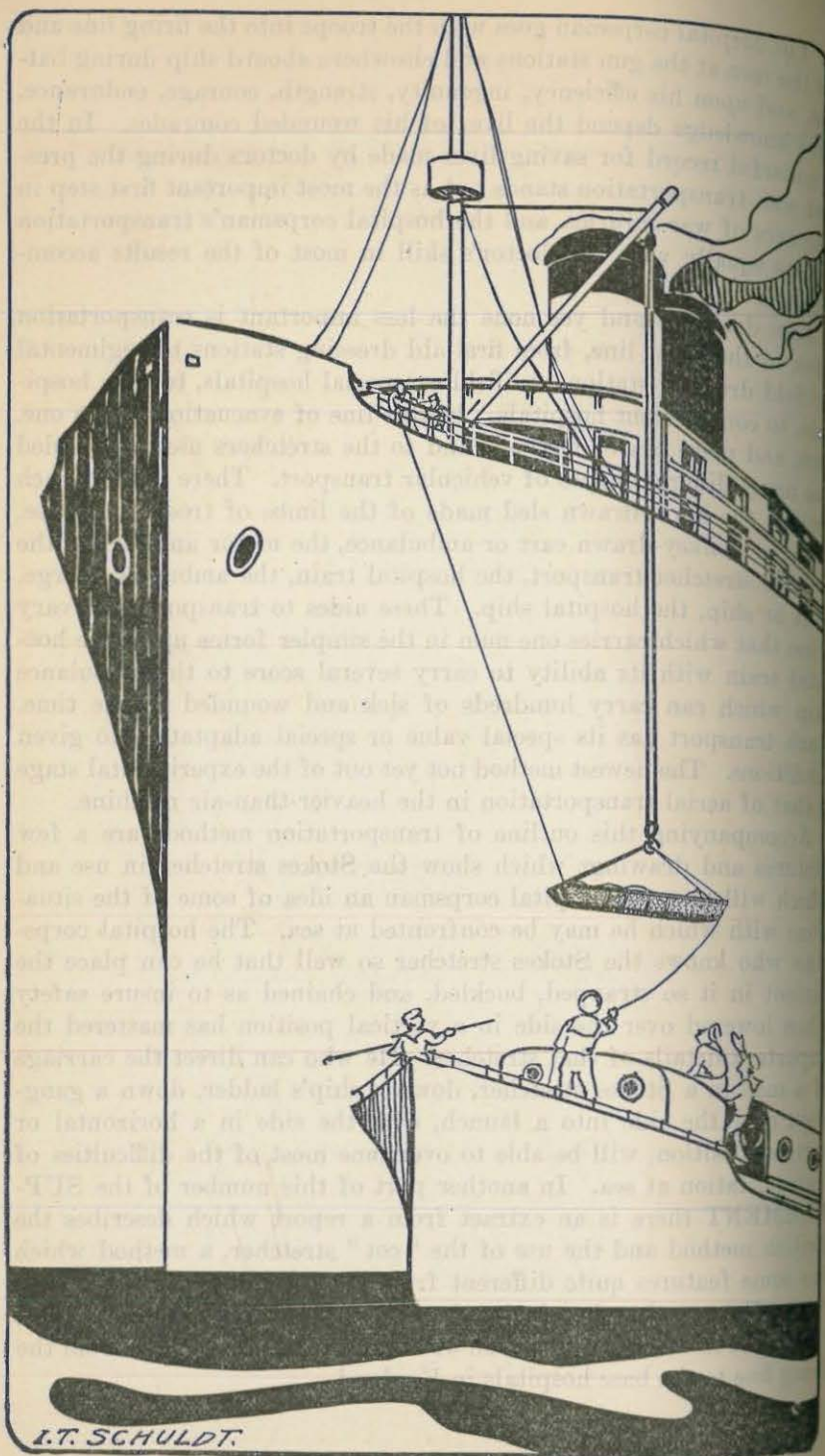
Lifting and carrying by one bearer.

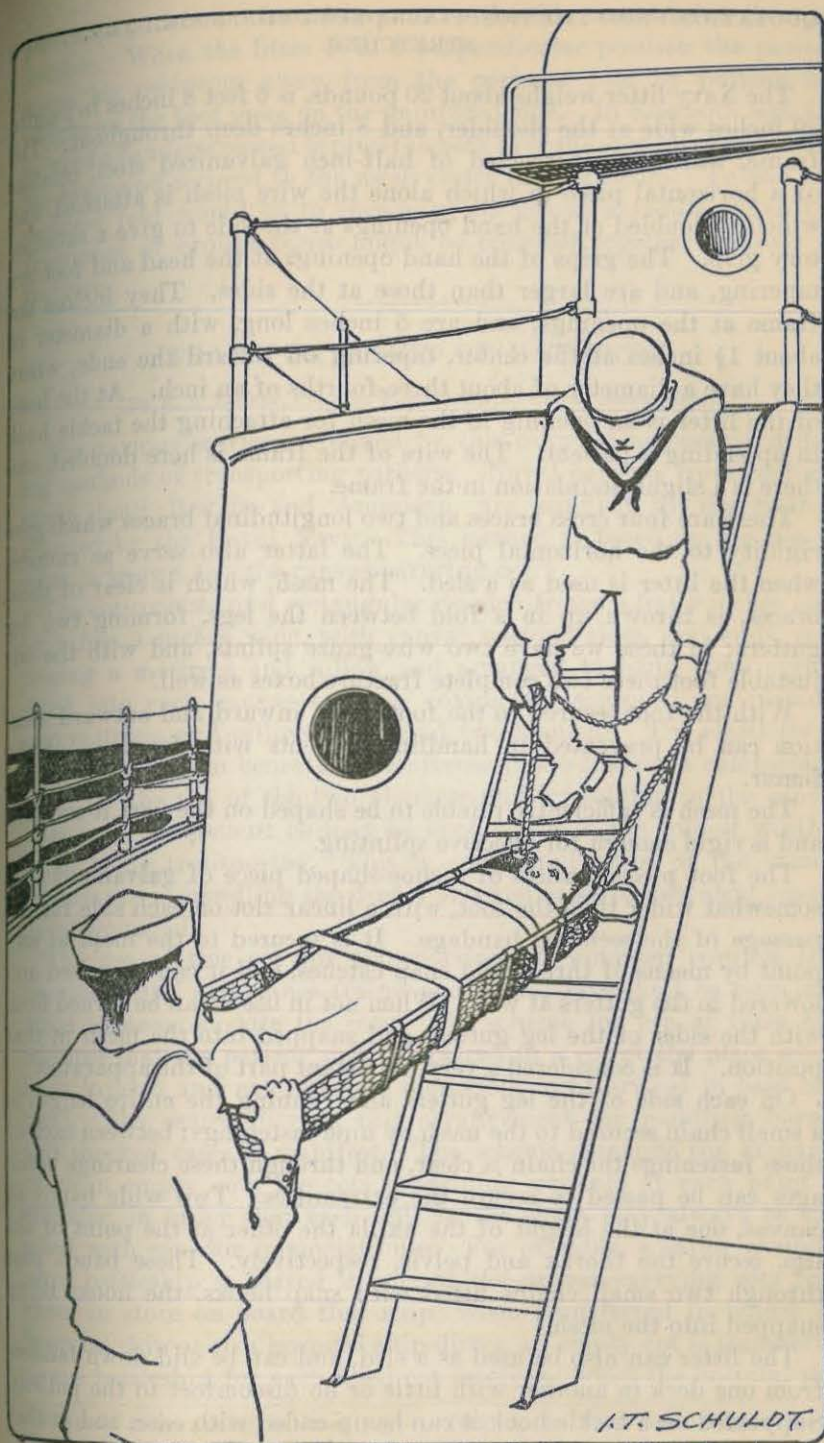


The hospital corpsman goes with the troops into the firing line and to the men at the gun stations and elsewhere aboard ship during battle, and upon his efficiency, ingenuity, strength, courage, endurance, and knowledge depend the lives of his wounded comrades. In the wonderful record for saving lives made by doctors during the present war, transportation stands out as the most important first step in the care of war injuries, and the hospital corpsman's transportation shares equally with the doctor's skill in most of the results accomplished.

Less dramatic and yet none the less important is transportation back of the front line, from first-aid dressing stations to regimental or field dressing stations, to field or special hospitals, to base hospitals, to convalescent hospitals. In this line of evacuation to the one, two, and more bearer methods and to the stretchers used are added the many different types of vehicular transport. There is the trench trolley, the horse-drawn sled made of the limbs of trees, the horse, mule, or donkey-drawn cart or ambulance, the motor ambulance, the tricycle stretcher transport, the hospital train, the ambulance barge, boat or ship, the hospital ship. These aides to transportation vary from that which carries one man in the simpler forms up to the hospital train with its ability to carry several score to the ambulance ship which can carry hundreds of sick and wounded at one time. Each transport has its special value or special adaptation to given conditions. The newest method not yet out of the experimental stage is that of aerial transportation in the heavier-than-air machine.

Accompanying this outline of transportation methods are a few pictures and drawings which show the Stokes stretcher in use and which will give the hospital corpsman an idea of some of the situations with which he may be confronted at sea. The hospital corpsman who knows the Stokes stretcher so well that he can place the patient in it so strapped, buckled, and chained as to insure safety when lowered over the side in a vertical position has mastered the important details of that stretcher. He who can direct the carriage of a man in a Stokes stretcher, down a ship's ladder, down a gangway, over the side into a launch, over the side in a horizontal or vertical position, will be able to overcome most of the difficulties of transportation at sea. In another part of this number of the SUPPLEMENT there is an extract from a report which describes the British method and the use of the "cot" stretcher, a method which has some features quite different from those common in the United States Navy and well calculated to meet the difficulties of the past four years in the transportation of many thousands of men from the firing line to the base hospitals in England.





A. T. SCHULDT.

QUOTATION FROM THE HOSPITAL CORPS DRILL BOOK. THE STOKES
STRETCHER.

The Navy litter weighs about 20 pounds, is 6 feet 8 inches in length, 20 inches wide at the shoulder, and 8 inches deep throughout. The frame, which is constructed of half-inch galvanized steel, consists of a horizontal piece to which alone the wire mesh is attached, and which is doubled at the hand openings at the side to give a satisfactory grip. The grips of the hand openings at the head and foot are tapering, and are larger than those at the sides. They inclose the frame at the openings, and are 5 inches long, with a diameter of about $1\frac{1}{4}$ inches at the center, tapering off toward the ends, where they have a diameter of about three-fourths of an inch. At the head of the litter is an opening in the mesh for attaching the tackle hook in up-ending a patient. The wire of the frame is here doubled, and there is a slight undulation in the frame.

There are four cross braces and two longitudinal braces which give rigidity to the horizontal piece. The latter also serve as runners when the litter is used as a sled. The mesh, which is clear of these braces, is thrown up in a fold between the legs, forming two leg gutters; in these we have two wire-gauze splints, and with the adjustable foot piece two complete fracture boxes as well.

With the foot secured to the foot piece, inward and outward rotation can be prevented in handling patients with fractures of the femur.

The mesh is sufficiently pliable to be shaped on the part it contains and is rigid enough for effective splinting.

The foot piece consists of a shoe-shaped piece of galvanized steel somewhat wider than the foot, with a linear slot on each side for the passage of the securing bandage. It is secured to the mesh at any point by means of three rigid snap catches, and it can be raised and lowered in the gutters at will. When not in use it can be turned flush with the sides of the leg gutters and snapped into the mesh in that position. It is considered a very important part of the apparatus.

On each side of the leg gutters and running the entire length is a small chain secured to the mesh by nine fastenings; between each of these fastenings the chain is clear, and through these clearings bandages can be passed to secure the extremities. Two wide bands of canvas, one at the height of the axilla the other at the point of the hip, secure the thorax and pelvis, respectively. These bands pass through two small chains fitted with snap hooks, the hooks being snapped into the mesh.

The litter can also be used as a sled, and can be slid down ladders from one deck to another with little or no discomfort to the patient. Supported on a tackle hook it can be up-ended with ease, and in that

position a patient can be safely put over the side or sent below through hatches. When the litter is in a perpendicular position the patient keeps his perineum away from the perineal fold by putting his weight on the foot piece on the uninjured side. In case both legs are injured a bandage passed behind the neck over the shoulders and under the arms and secured to the mesh clears the perineum. To pad the perineal fold would be to encourage its use as a saddle, when the fragments of broken bones might be crowded together in cases of fracture.

TRANSPORTATION OF PATIENTS.¹

By E. S. BOGERT, Captain, Medical Corps, United States Navy.

The various services rendered by this hospital necessitate differing methods of transporting patients. Naval patients from the force afloat, both British and American, are handled by the method adopted by the Royal Navy. This method is based on the use of what is known as "the canvas carrying cot."

The cot consists of a rectangular wooden frame 5 feet 9 inches long by 2 feet 4 inches wide, with canvas bottom, sides, and ends, containing a mattress and pillow and arranged to hang from eyelets fitted into each canvas end. A completely equipped cot includes also mattress and pillow covers and two blankets. The elasticity of the canvas bottom beneath the mattress makes this cot a comfortable bed. By the use of the two blankets and by folding in the canvas sides over the patient he may be kept warm in the coldest weather while being transported. This is considered to be of the utmost importance in handling the deeply shocked cases so prevalent among naval wounded.

The use of this cot for transporting all wounded requires that hospital ships, ambulance trains, and ambulances shall be especially fitted to accommodate the cots. The scheme for use of these cots requires that the patient shall be placed in a cot at the place where he is injured and not removed therefrom until arrival in base hospital. The desirability of this arrangement for handling burned and shocked cases is manifest. The scheme demands the exchange of clean empty cots for cots containing patients at each point of transfer, in order that each unit in the chain may always be supplied with cots for immediate use. For example, a sailor wounded on a battleship is placed in one of the canvas carrying cots from those in store on board that ship; when transferred to tender for hospital ship or to a hospital ship direct, an empty cot is transferred to the battleship for each filled cot received; when the hospital ship

¹ Extract from Annual Sanitary Report, 1918, U. S. Navy Base Hospital No. 2, Strathpeffer, Scotland.

transfers the patients at port of debarkation to ambulance train, the train transfers to the ship empty for filled cots; and when the train unloads to hospital ambulance, again the exchange of empty cots for cots in use takes place. Thus, each unit is constantly equipped for reemployment. In the event that the number of seriously wounded on board ship may exceed the number of cots carried in store, each tender to hospital ships, each hospital ship, and each port of debarkation is supplied with an extra allowance of cots to meet such an emergency.

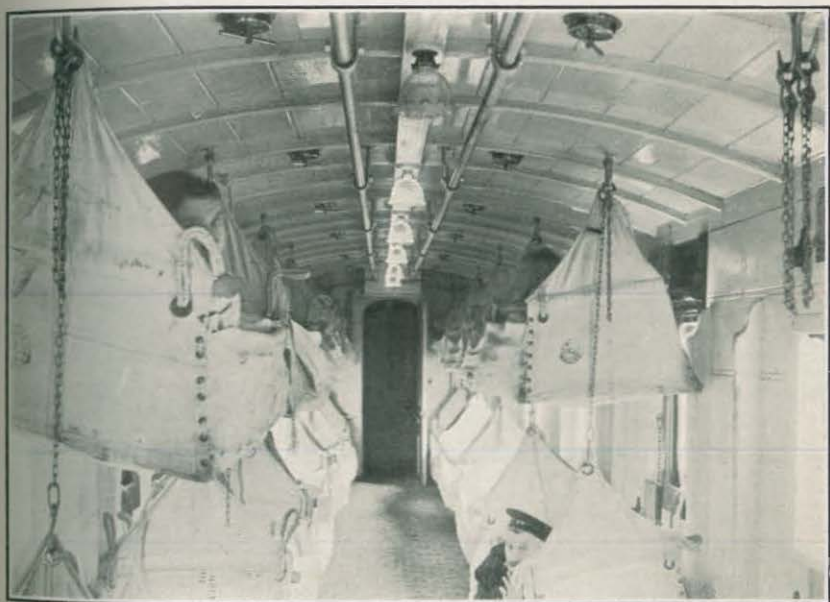
The Royal Navy ambulance trains are fitted with hooks to hang these cots in two tiers, the cot being prevented from swaying while en route by holding the rigid wooden frame against padded buffers attached to the side of the car by spring hooks catching on the inboard side of the frames. Ambulances are fitted with bodies arranged to carry four of these cots at one time. Our American ambulance bodies fitted for carrying Army litters are too narrow to allow two of these cots to lie alongside one another, and hence can not be profitably used; so that this hospital is supplied with four ambulances fitted in accordance with the custom of the British Navy. To handle these cots gently and easily requires the services of four bearers. A certain knack is required to handle this rigid and comparatively heavy structure, which is not fitted with handholds. Lieut. John Weir, R. N. V. R., graciously volunteered to instruct and drill the hospital corpsmen attached to this hospital in the methods of handling these cots, and under his able tutelage they rapidly acquired the knack and ability to transport patients with celerity and gentleness.

In order to fit our Navy to cooperate with the British Navy in this method of transporting wounded, each battleship has been supplied with 25, each mine-laying vessel with 12, and each first-line hospital with 200 of these cots. Preliminary communications to each unit in the transportation chain are necessary to the efficient working of the scheme and have been carefully arranged. The orders and instructions on this subject issued to the British Navy are confidential, but may be said to include a preliminary warning signal at the beginning of a naval engagement, followed by detailed information and instructions as necessary.

For a first-line base hospital the procedure would be about as follows: On receipt of the "stand-by" signal, it would be determined what patients in the hospital were in condition for travel; such patients and their papers and baggage would be prepared for transfer to a second-line hospital; the railway officials at a near-by junction would be informed of the number of sitting and lying-down cases that were to be transported by ordinary coaches in order to allow



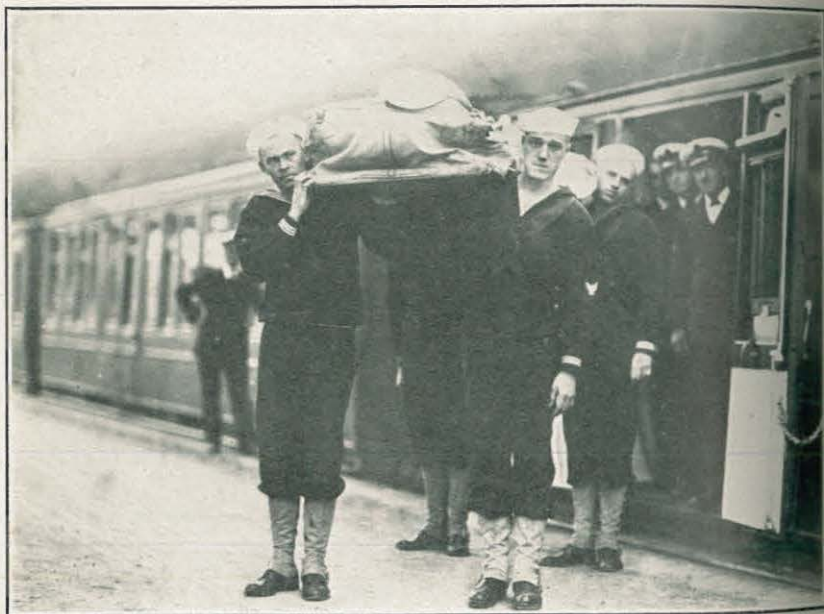
Transportation by British Navy cot.



Interior of cot car, British naval ambulance train.



American hospital corpsmen ready to unload British Army ambulance train.



Transporting loaded cot.

them to prepare, from coaches held for the purpose, the train necessary to transport these cases; and the patients unfit for travel and to be retained in hospital would be segregated in preparation for receipt of wounded requiring surgical attention. The next signal would probably be in the nature of preparatory information and would state that a certain hospital ship would arrive at a specified port of debarkation at about such an hour on a specified date, and that details would be furnished later. Or the message might be that a certain combatant ship would arrive at a near-by dockyard at about such an hour and date, and that the hospital should prepare to evacuate her of so many wounded by ambulance. By this time the principal medical transport officer and the district medical transport officer will have had information of the number of wounded to be handled, and the hospital will receive an order to evacuate all patients fit for transportation by rail to such a specified second-line hospital, or to such a point on the railroad where orders as to destination will be received. The hospital will then direct the railroad authorities to send from the junction point the train already prepared and being held awaiting demand. The patients to be evacuated will be removed to the railroad station and will be loaded into the train immediately upon its arrival. By the time this is completed, or maybe before, a signal will be received giving the hospital definite information of the patients to be received. The message will state that a certain ambulance train will evacuate the wounded from a certain hospital ship at a specified port of debarkation, and that the cases to be discharged to this hospital will consist of so many officer cases in cots, so many walking officer cases, so many enlisted ratings cot cases, and so many enlisted noncot cases; that the wounded, mental, and infectious cases are so many; that so many require special diets; that so many require a guard; and that so many require the services of nursing sisters.

Now, the hospital can make internal arrangements for the disposition of the patients on arrival and can make local transportation arrangements. The next signal will be from the surgeon in charge of the ambulance train and will confirm the numbers in each class of cases to be discharged to this hospital, will give time of arrival of train, and will add any necessary details requiring prompt action by the hospital. When the hospital train reaches its destination the sick-berth stewards of its crew unhook the cots and pass them out to stretcher bearers from the hospital, who are drawn up on the platform and who in turn load them into waiting ambulances. It requires four bearers to properly handle loaded cots. Four cots are loaded in each ambulance. As soon as each ambulance is loaded it proceeds to the hospital, where other stretcher bearers unload it and carry the patients to their beds, the ambulance returning to the rail-

way station for another load. A number of clean, empty cots equal to the number of cot cases to be evacuated from the ambulance train having been previously provided are stacked on the station platform. This reduces to the minimum the round-trip time of the ambulances from station to hospital and return, and expedites the unloading of the train. While the cot cases are being handled by the squads designated for the purpose the walking cases are mustered by another detail and sent to hospital by ambulance loads of sitting cases, i. e., about 14 to each load. A third detail from the hospital receives, checks, and loads on lorries the baggage of the patients. When the ambulance train is unloaded of patients, clean empty cots are passed on board to replace the number of cot cases unloaded. Receipts for patients' baggage and valuables transferred are then given to the commanding officer of the train. Thus in 30 minutes after an ambulance train arrives at the railway station platform it is rolling out equipped and ready for service.

The method of handling British Army patients differs essentially from that used with the naval patients. The hospital reports by telegraph daily to the director of medical services for the district the number of vacant beds for army cases. The district director of medical services, in turn, reports this to the director of medical services for the army command and also to the medical debarkation officer at the port on the south coast of England at which wounded from the front in Belgium and France are disembarked. The debarkation officer transfers the wounded and sick from trans-Channel vessels to army and Red Cross ambulance trains and dispatches the trains to the various military hospitals throughout the realm in accordance with the vacancies reported and the character of the cases. Certain hospitals are designated as "special surgical hospitals" because of their facilities and the surgical ability of the staff attached. To such hospitals the more seriously wounded are sent. This hospital is designated as such a hospital. The debarkation officer having decided to send a trainload or a partial trainload of wounded to this hospital, sends two telegraphic notices and the surgeon in charge of the train sends a third. Thus the hospital is fully prepared to handle the cases by the time of their arrival. The first message from the debarkation officer, whose code name is "Nerves Southampton," is preparatory and gives only the number of patients, officers and men, who are about to be dispatched. The second telegram gives the hour of departure of the train from debarkation port and details of the number of cases, number of officers and men, and numbers of cot and noncot cases. In this and other messages commissioned officers are referred to as "officers," and noncommissioned officers and men are indicated by "other ranks." The third telegram is from the surgeon in charge of the train transporting the patients,

is transmitted while en route and after checking of his patients, and gives exact numbers of cases. Sometimes this message gives estimated time of arrival, but usually this is left to the calculation of the hospital, based on the time and station from which the message is sent.

The following are copies of the three telegrams in regard to one convoy which did not include any officers but did include both medical and surgical cases. (1) "OHMS, Southampton. Handed in at 8.35 a. m. Received here at 10.16 a. m. Navhosp Strathpeffer Scotland. AD5557/18 aaa Prepare to receive today Thursday about 120 patients aaa Hour of departure will be sent later aaa Nerves Southampton."

(2) "OHMS Py Southampton. Handed in at 11.22 a. m. Received here at 12.05 p. m. Navhosp Strathpeffer Scd. B22/893-18 aaa No. 2 ambulance train despatched at 10.40 to Strathpeffer with other ranks 140 cots aaa Nerves Southampton." (3) "OHMS Priority Birmingham Snow Hill. Handed in at 3.15 p. m. Received here at 5 p. m. Navhosp Strathpeffer Scd. B22/892/18 aaa Convoy No. 2 ambulance train consists of surgical cases 108 cots aaa Medical cases 29 cots including one malaria aaa Nerves Southampton." The difference in three cases between telegrams (2) and (3) was due to the fact that the surgeon in charge of the train had unloaded and left at hospital enroute three chest-wound cases who were not standing the journey well.

The British Army and Red Cross ambulance trains used in transporting British Army wounded in Great Britain carry the patients in bunks in two or three tiers. The patients are transferred from hospitals in France on stretchers and with no clothing other than perhaps a suit of underclothes or pajamas. These facts necessitate an entirely different method of handling these patients from that described above as used for navy patients. To discharge a military ambulance train the base hospital must needs supply at the railway station stretchers, blankets, and pillows necessary for properly handling the cases when removed from their bunks. A number of United States Army type of litters, each with pillow and two blankets, are laid out on the station platform prior to the arrival of the train. When the train comes to a halt two hospital litter bearers with each litter enter the car and place the litter in the narrow gangway between the tiers of bunks. The train crew assist the hospital litter bearers in transferring the patients from their bunks to the litters, they are covered by the hospital blankets, and borne to the ambulance by the hospital bearers. It will be noted that in this method the train crew assist only in transferring the patients from their berths to litters. This transfer is often extremely painful with certain of the wounded; in fact, the army method of handling wounded, involving as it does frequent transfers of the patient from

stretcher to cot, cot to stretcher, stretcher to train, train berth to stretcher, etc., compares most unfavorably with the navy method. By the navy method the patient is handled more gently and humanely, he travels more comfortably, shock is prevented or lessened, and there is no danger of inflicting further injuries to already damaged structures during transfers from one to another unit of the line of communications.

QUESTIONS AND ANSWERS FOR A COURSE IN EMBALMING.

By H. B. CHATFIELD, Pharmacist (T), United States Navy, and T. H. McNALLY, Pharmacist's Mate (2 c.), United States Naval Reserve Force.

In the following series of questions and answers it has been the endeavor of the writers to formulate a course of embalming adapted to the use of the Hospital Corps, United States Navy.

Owing to the previous training received by our hospital corpsmen, and the subject matter contained in the Handy-Book for the Hospital Corps, 1917, chapters on hygiene, sanitation, chemistry, and bacteriology have been omitted. Anatomy has been reviewed only in so far as it is of special interest to the embalmer.

ANATOMY.

1. *Name the bones of the head, upper extremities, pelvis, and lower extremities.*—The bones of the head are divided into two classes—i. e., cranium and bones of the face. Those forming the cranium are the occipital, two parietals, frontal, two temporals, sphenoid, and ethmoid. Those of the face are two nasals, two maxillaries, two lacrimals, two malars, two palates, two turbinates, vomer, and mandible. The entire skull is made up of 22 bones; 8 in the cranium and 14 in the face. The bones of the upper extremity are the clavicle and scapula, the humerus in the arm, ulna and radius in the forearm, 8 carpal bones in the wrist, 5 metacarpals, and 14 phalanges. The pelvis consists of two hip bones, or ossa innominata, the sacrum and coccyx. In the lower extremity are the femur, the tibia and fibula, patella, tarsal, metatarsal, and phalanges.

2. *Locate and describe the sternum.*—The sternum, or breastbone, is a flat bone formed of three parts. The upper part, the manubrium, is roughly triangular in shape, the apex of the triangle joining the sternum in the middle. The base of the sternum has a notch on either side for articulation with the clavicle. Immediately below this articulation is another notch for the reception of part of the cartilage of the second rib. The middle part of the sternum is called the gladiolus and is joined above by the manubrium and below by the

third part of the sternum called the ensiform cartilage. The lateral borders of the gladiolus are notched for the reception of the cartilages of the third, fourth, fifth, sixth, and part of the second and seventh ribs. The ensiform cartilage is a thin piece of bone, cartilaginous in youth, that extends from the lower end of the gladiolus. Its upper border is notched for the articulation of the seventh rib.

3. *Describe the spinal column.*—The spinal or vertebral column is a series of bones placed one on the other, extending from the base of the skull to the interval between the buttocks and forms what is known as the backbone. There are 33 bones in the spinal column called vertebrae, and they are divided into the 7 cervical, situated in the neck; 12 thoracic at the back of the chest; 5 lumbar in the back of the abdomen; 5 sacral and 4 coccygeal, the sacral and coccygeal entering into the formation of the pelvis.

4. *Give a description of the ribs.*—The ribs are flat, elastic arches of bone, 24 in number, 12 on each side of the median line. The true ribs are connected with the breastbone by a cartilage and are 7 in number on either side. The cartilages of the eighth, ninth, and tenth are fused together and are called the false ribs; the eleventh and twelfth ribs have no cartilages and are therefore called the floating ribs.

5. *Name the bones that articulate at the shoulder joint.*—The scapula, clavicle, and humerus.

6. *Into what regions is the abdominal cavity divided for the study of anatomy?*—It is divided into nine regions, and these regions are named from above downward as follows: Right and left hypochondriac with the epigastric in the middle; right and left lumbar with the umbilical in the middle, and the right and left inguinal with the hypogastric in the middle.

7. *Name the large cavities of the body.*—The cranial, thoracic, and abdominal cavities.

8. *Name and locate the principal organs of the body.*—The brain in the head; lungs and heart in the thoracic cavity; stomach, liver, intestines, and bladder in the abdominal cavity.

9. *Describe (a) heart, (b) lungs, (c) stomach, (d) liver, (e) bladder (f) intestines.*—The heart is a hollow, muscular organ, pyramidal in shape, located in the front and center of the thoracic cavity and extends from the second costal cartilage above to the interval between the fifth and sixth ribs on the left side, and from about one-half inch to the right of the right border of the sternum to about three-quarters of an inch to the left of the left border of the sternum. Its base is directed upward, backward, and to the right, while the apex is downward and to the left. The heart is inclosed in a serous membranous sac called the pericardium; between the two surfaces is a fluid called the pericardial fluid which lubricates the surfaces

and prevents friction during the movements of the heart. The inside of the heart is also lined with a serous membrane called the endocardium. The muscular portion of the heart is called the myocardium and is made up of involuntary muscular fibers.

There are two lungs, one on either side of the thoracic cavity. The right lung has three lobes, the left lung has but two. There are two types of circulation in the lungs, the blood coming from the right ventricle passes through the pulmonary arteries to the lungs to give off the CO_2 and receive a fresh supply of oxygen and that coming from the bronchial branches of the aorta for the supply of the lung itself.

The stomach is a hollow organ about 13 inches long, $3\frac{1}{2}$ inches wide, and 5 inches deep and has a capacity in the adult of about 5 pints. It has two openings, the cardiac and the pyloric. It also presents two curvatures, the lesser, which is a continuation of the right margin of the esophagus, and a greater curvature which forms the lower convex surface. It has three coats, the external or serous coat, the middle or muscular coat, and the internal or mucous coat. The latter is arranged in many folds and contains many glands for the secretion of the gastric juice.

The liver is a large organ situated in the upper right side of the abdomen, directly under the diaphragm, and held in position by ligaments formed of the peritoneum. It is supplied with blood from two independent sources: The hepatic artery and the portal vein, that supplied by the artery being only for the connective tissue framework of the organ. The portal vein enters the liver in the same fissure by which the hepatic artery enters (transverse fissure) and brings to the liver blood collected from the capillaries of the organs of digestion and absorption and these soluble products are submitted to the action of the liver cells before reaching the general circulation. This blood finally makes its exit from the liver by means of the hepatic veins which empty into the inferior vena cava. The liver has five lobes and five fissures and in one of these fissures on the under surface of the right lobe of the liver there is lodged the gall bladder, a pear-shaped organ 3 or 4 inches in length with a capacity of 30 or 40 milliliters and whose function is to serve as a reservoir for bile. The function of the liver is to manufacture bile, to manufacture and store glycogen, as well as to reconvert this to dextrose, if such be necessary, by the action of an enzyme in the liver, and to form urea.

The urinary bladder is a muscular membranous sac in the pelvis, just below the pubes and does not, under normal conditions, extend above the height of the upper border of the symphysis pubis; when greatly distended it may reach as high as the umbilicus. It acts as a

reservoir for urine until it is convenient to discharge this fluid (mic-turition). In the undistended condition the bladder is covered by the peritoneum, except the anterior and part of the inferior surfaces. It is held in place by various ligaments which are derived partly from the peritoneum and partly from the tissues lining the pelvis. Upon the inner surface of the bladder the mucous membrane is thrown into folds (*rugæ*) except over the area known as the vesical trigone. The trigone is a triangular surface outlined by the three openings into the bladder, the entrance for the ureters and the orifice for the urethra.

The intestine is a musculo-mucous tube about 28 feet long, beginning at the pyloric opening of the stomach and ending in the anus. It is divided into the large and the small intestines. The small intestine is about 22 feet long and is divided into three parts: The duodenum, 12 inches long; jejunum, 9 feet long; and the ilium, 13 feet long. It has three coats, the outer or serous coat, middle or muscular coat, and inner or mucous coat. The inner coat is arranged in little elevations called villi and inside of these villi are small capillaries which absorb directly the products of digestion, and a large lymphatic capillary or lacteal that collects the properly digested foods and transmits them to the general circulation through the thoracic duct. The intestines have a vermicular motion, carried out by the muscular coat, called peristalsis. The large intestine is about 6 feet long and is divided into the following parts: The cecum ascending, transverse, and descending colon; the sigmoid flexure; and the rectum. The appendix is an outshoot of the lower end and back of the cecum. The large intestine has the same number of coats as the small intestine and at the entrance of the small intestine into the large intestine is an opening or valve called the ileocecal valve; it prevents the regurgitation of food into the small intestine. The rectum acts as a reservoir for the unused portion of the food which is expelled by voluntary act of defecation.

10. *Describe the brain.*—The brain is contained in the cranium and may be divided into four parts: 1, the cerebrum; 2, cerebellum; 3, the pons Varolii; and 4, the medulla oblongata. The cerebrum comprises the principal part and weight of the brain. It is divided by the longitudinal fissure into lateral halves, the undersurface of each being still further divided into three lobes, known as the anterior, posterior, and middle lobes.

The cerebellum is placed posteriorly to the cerebrum and is nearly seven times smaller. The superior vermiform process divides the cerebellum into two hemispheres, which are further divided into lobes and processes. The cerebellum is the center for the coordination of muscular movement, while the cerebrum which lies anterior

and above the cerebellum, is the center of reason, intelligence, and will.

The medulla oblongata is the upper expanded portion of the spinal cord. It is the most vital part of man, and it is said to be the only place an injury of which will cause instant death. It controls the functions of circulation, respiration, and deglutition.

The pons Varolii is the commissure which connects the cerebellum to the medulla oblongata. It is composed of a broad band of white fibers which arch on either side and enter the cerebellum in the form of a thick round cord. The basilar artery, which is formed by the vertebrals and assists in the formation of the Circle of Willis, runs through the fissure made by this division, into the two cords of fibers which enter the cerebellum on each side.

11. *What is the Circle of Willis?*—The Circle of Willis is that circle of arteries located at the base and the under surface of the brain. It is formed by the two internal carotid arteries and the basilar; the branches of these arteries uniting to form the circle. The two anterior cerebral branches of the internal carotid are joined together by the anterior communicating artery, which completes the front part of the circle. The back part of the circle is formed by the two posterior cerebral branches of the basilar artery, which is joined to the branches of the internal carotid artery by the posterior communicating artery, thus completing the circle.

12. *Locate and describe the sinuses of the brain.*—They are five in number and are as follows: The superior longitudinal begins in what is known as the foramen cæcum and runs over the central portion of the brain between the two hemispheres to the back of the skull and ends in the Torcular Herophili. The inferior longitudinal sinus, much smaller than the superior, begins at a point below that vessel and passing backward terminates in the straight sinus which enters into the Torcular Herophili. The lateral sinuses are of large size. They commence at the Torcular Herophili and pass horizontally outward on either side of the head to the temporal bone, ending in the internal jugular veins. The occipital sinuses, two in number, commence in the small veins which communicate with the posterior veins and terminate in the Torcular Herophili. The sinuses receive the blood from the veins of the head and brain, and it is returned largely through the internal jugulars to the heart. These vessels receive all of the cerebral veins.

13. *Trace the blood from the heart to either hand and return.*—From the left ventricle to the aorta, from the aorta to the innominate, subclavian, axillary, brachial, radial, and ulnar to the palmar arches, to the capillaries, to the plexus on the back of the hands to the veins, the ulnar and median basilic, which pass up the back of the

arm to the elbow. These two veins unite and form the basilic vein on the inner side of the brachial artery. The basilic becomes the axillary, then the subclavian, which is joined at the sterno-clavicular joint by the internal jugular, thus forming the right innominate vein which passes down the chest and joins the left innominate vein forming the superior vena cava, which enters the right auricle, to the right ventricle, through the pulmonary circulation to the left auricle, to the left ventricle.

14. *Trace the blood from the heart to the face and return.*—The blood leaves the left ventricle and enters the aorta, from there to the innominate, to the common carotid, up the neck to the "Adam's apple," giving off two branches, the external and internal carotid. The external carotid goes to the head, face, and neck, outside, through the capillaries to the vein plexus at angle of the jaw, from the plexus to the external jugular vein which runs down the neck from the angle of the jaw to the center of the clavicle just under the chin, then to the superior vena cava to the heart.

The internal carotid enters the skull through the carotid canal in the temporal bone, giving off a large branch to the eye, lower part of the forehead, and to the nose. This is the ophthalmic artery. Another branch of the internal carotid, the anterior cerebral, forms the front part of the Circle of Willis. Through the Circle of Willis to the internal jugular vein which passes down the neck with the carotid artery. When the internal jugular reaches the sterno-clavicular joint it is joined by the subclavian vein. These two form the innominate vein. The two innominates join, pass down the chest, and make the superior vena cava. This enters the right auricle, then through the pulmonary circulation to the left auricle to the left ventricle.

15. *Trace the blood from the heart to the leg and return.*—From the left ventricle to the aorta, left common iliac, left external iliac, femoral, popliteal, anterior and posterior tibial, to the plantar arches, through the capillaries to a plexus of veins on top of the foot, to the internal and external saphenous. The internal saphenous passes up the inner side of the leg to Scarpa's triangle and joins the femoral vein there. The external saphenous passes up the outer side of the leg and becomes the popliteal vein behind the knee. The popliteal becomes the femoral vein which passes through Hunter's canal to the center of Poupert's ligament, where it becomes the external iliac vein, then becomes the iliac; these two common iliacs unite to form the inferior vena cava which enters the right auricle of the heart, then through the pulmonary circulation to the left auricle to the left ventricle.

16. *Name and trace the arteries branching from the thoracic aorta.*—They are the bronchial, which are the nutrient vessels of the

lungs; the esophageal, supplying the esophagus; the pericardial supplying the pericardium; and numerous small branches which supply the ribs and muscles between them, as the intercostals.

17. *Name and trace the arteries branching from the abdominal aorta.*—The phrenic arteries, right and left, which supply the diaphragm; the celiac axis, which divides into the gastric for the stomach, the hepatic for the liver and gall bladder, and the splenic, which supplies the pancreas and spleen; the suprarenals, right and left, which supply the suprarenal glands; the superior and inferior mesenterics which supply the large and small intestines; the renals, right and left, which supply the kidneys; the spermatics (ovarials in female), right and left, which supply the spermatic cord and various muscular branches (lumbar), which supply the lumbar muscles.

18. *What is the celiac axis?*—The celiac axis arises just below the diaphragm, comes forward half an inch, and divides into the gastric, hepatic, and splenic arteries, occasionally giving off one of the phrenics.

19. *How is the circulation divided?*—Into four groups: Systemic, pulmonary, portal (an appendage of the systemic), and the capillary.

20. *Describe each division.*—The systemic circulation is that which takes place between the left and right ventricle of the heart and is as follows: The pure blood is forced from the left ventricle of the heart through the semilunar valve into the great aorta, from which it is distributed through the little vessels called capillaries; after passing through these little vessels it is gathered up by the veins and conveyed to the right auricle of the heart; from the right auricle it passes through the tricuspid valve into the right ventricle, thus completing the systemic circulation.

The capillary circulation is that which takes place between the arteries and the veins, through the fine network of vessels called capillaries. It is while the blood is passing through these very minute vessels that the lymph is thrown off into the tissues to nourish them.

The pulmonary circulation commences at the right ventricle of the heart, the venous blood being forced through the semilunar pulmonary valves into the pulmonary arteries and along those vessels to the lungs, where it is purified by oxygen. It then returns, through the four pulmonary veins, to the left auricle of the heart, thus completing the pulmonary circulation.

The portal circulation is that which takes place between the food veins and the liver; the mesenteric, gastric, and splenic veins unite behind the head of the pancreas to form the portal vein which enters the liver and ramifies throughout the substance of that organ, di-

viding into capillaries and radicals, which again unite to form the hepatic veins, which return the blood to the inferior vena cava.

A knowledge of the foetal circulation is not necessary to the embalmer.

21. *What arteries and veins are of particular interest to the embalmer?*—The carotids, axillaries, brachials, radials, and ulnars, and the femorals.

22. *Locate and give the landmarks of each.*—The carotids are found in the neck, one on each side of the trachea. The right starts from the innominate artery behind the sternoclavicular joint, runs up the neck to the "Adam's apple," where it divides into the external, to the face, and the internal to the brain and the membranes. The left carotid starts from the arch of the aorta.

The axillary is found in the axillary space or arm pit. Takes its origin from the subclavian artery at the outer border of the first rib, passes down the axilla $4\frac{1}{2}$ inches, and terminates in the brachial. The vein is on the inner side of the artery and is used for the vein tube.

The brachial passes down the inner side of the arm on the inner side of the biceps muscle for two-thirds of its length, the lower third comes forward to the front of the elbow. It terminates at the front of the elbow joint in the radial and ulnar arteries. The basilic vein accompanies the artery.

The radial passes down the forearm on the thumb side and has no vein.

The ulnar passes down the forearm on the little-finger side, both arteries forming the palmar arches; the radial at the wrist forms the deep palmar arch lying near the surface and is the pulse artery, while the ulnar forms the superficial palmar arch. The femoral artery is found in the groin, upper part of thigh, in Scarpa's triangle, and has its origin from the external iliac artery to the center of Poupart's ligament. It passes down the thigh through Hunter's canal and terminates three-fourths of the way down in the popliteal artery. The vein is on the inner side.

23. *Name the ways in which you can tell whether you have picked up an artery or a vein.*—By the appearance, smaller than vein; by structure, the middle coat is thicker than in the vein; by anatomical position, by landmarks, and by touch.

24. *What is the composition of blood?*—The blood is composed of a liquid part known as the plasma or liquor sanguinis, in which floats a vast number of microscopical bodies known as corpuscles. The reaction is neutral and the specific gravity 1.055.

25. *What causes coagulation of the blood?*—When blood is exposed to the air fibrin is formed from the fibrinogen. The blood cells become entangled in this fibrin and form a clot.

26. *How would you dissolve or disintegrate blood clots in arteries or in veins?*—Use a solution of sulphate of soda and water, using about 12 per cent of the sulphate of soda. If this is not at hand, use a 10 per cent solution of chloride of sodium. It is claimed that a 25 per cent solution of magnesium sulphate completely prevents any coagulation of blood.

27. *In what cases does blood coagulate most quickly?*—Typhoid fever, Asiatic cholera, pregnancy, strangulation, and influenza.

28. *Is it necessary to remove the blood from the body after death?*—In some cases it is absolutely essential to remove the blood from the body in order to obtain a lifelike appearance, while other cases do not require the removal. It is entirely up to the embalmer to use his discretion, as no two bodies are alike.

29. *In how many ways would you remove blood from the body?—Describe each.*—By the use of the vein tube and by the trochar. To use the vein tube, raise the vein along the artery, tie off as in the case of the artery, grease the tube and insert through the incision. In using the trochar, insert it about 3 inches below the sternum and 2 inches to the right of the median line of the body. From this point all parts of the thoracic cavity and the abdominal cavity can be reached. Tap the heart, preferably the right auricle, and draw off the blood by the use of the aspirator.

30. *What particular nerves are of interest to the embalmer, and why?*—The brachial and the anterior crural nerves, as they act as landmarks in raising the respective arteries.

31. *Where does the blood go after death?*—In death due to natural causes, the blood will be found in the veins, but in death due to accidents and a few diseases, the blood will be found in the arteries.

EMBALMING.

1. *Define embalming.*—Embalming is the science which treats of the disinfection and preservation of dead bodies by the intelligent use of chemicals.

2. *What are the principal points that are to be sought in embalming?*—Thorough disinfection, preservation for an indefinite length of time, and the natural lifelike appearance of face and hands.

3. *How soon after death should a body be embalmed?*—Some authorities state that it is preferable to place the body on an inclined table for several hours and allow the blood to gravitate to the dependent parts, as it may then be more easily drawn off. In case of any death by disease which will result in the clotting of the blood soon after death the body should be embalmed as soon as possible. Recent observation of 150 cases of death from influenza and pneu-

monia showed that bodies embalmed within three hours of the time of death resulted in perfect bodies, and in those lying from three to eight hours it was impossible to remove the coagulation from the smaller arteries and veins, resulting in a bluish appearance of the hands, face, and neck.

4. *What is rigor mortis?*—It is a contraction of the muscles and a hardening of the muscle plasma called myosin.

5. *How soon after death does rigor mortis set in and what is the duration?*—In wasting diseases like tuberculosis it appears soon after death and may pass away in about two or three hours. Rigor has been known to be present before death. Rigor mortis may not appear in a healthy person that has been killed by accident from 18 to 20 hours after death, but when it does appear it has been known to last for several days. It appears in all cases and should be broken up before starting to embalm.

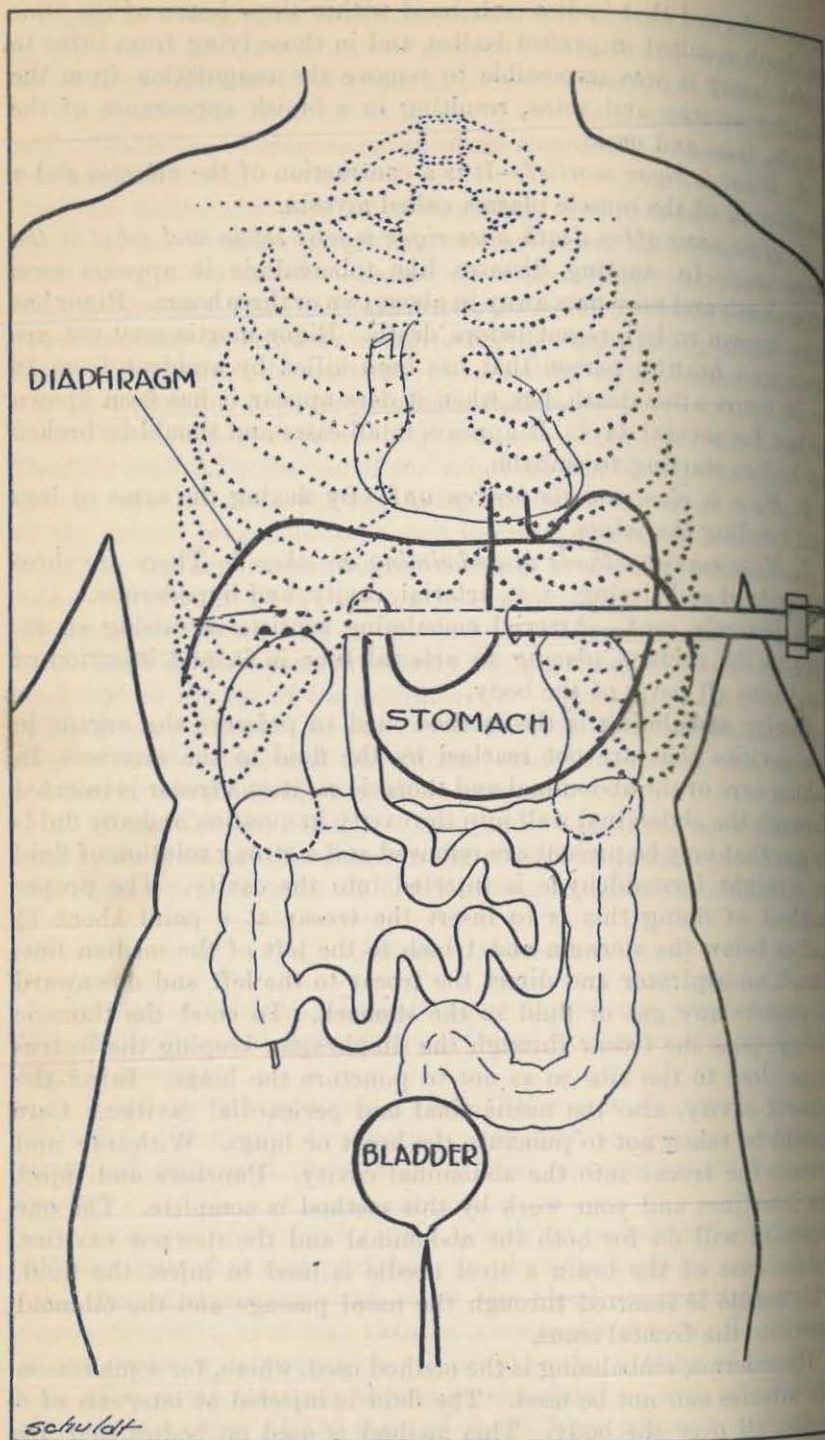
6. *How is rigor mortis broken up?*—By flexing the arms or legs and bending the joints.

7. *How many methods of embalming are there?*—There are three methods of embalming—i. e., arterial, cavity, and hypodermic.

8. *Describe each.*—Arterial embalming consists in raising an artery to the surface, placing an arterial tube in it, and injection of fluid into all parts of the body.

Cavity embalming is the method used to preserve the organs in the cavities that are not reached by the fluid in the arteries. In taking care of the abdominal and thoracic cavities a trocar is inserted through the abdominal wall into the cavity in question and any fluids or gas that may be present are removed and a strong solution of fluid or straight formaldehyde is injected into the cavity. The proper method of doing this is to insert the trocar at a point about 1½ inches below the sternum and 1 inch to the left of the median line, attach an aspirator and direct the trocar to the left and downward to remove any gas or fluid in the stomach. To enter the thoracic cavity, pass the trocar through the diaphragm, keeping the instrument close to the ribs so as not to puncture the lungs. Inject the pleural cavity, also the mediastinal and pericardial cavities. Care should be taken not to puncture the heart or lungs. Withdraw and reverse the trocar into the abdominal cavity. Puncture and inject the intestines and your work by this method is complete. The one puncture will do for both the abdominal and the thoracic cavities. In the case of the brain a steel needle is used to inject the fluid. This needle is inserted through the nasal passage and the ethmoid bone into the frontal sinus.

Hypodermic embalming is the method used, where, for some reason the arteries can not be used. The fluid is injected at intervals of 6 inches all over the body. This method is used on bodies that are



badly decomposed, badly burned, or in some way injured so that the arteries can not be used.

The arterial method is the one universally used on account of its simplicity and neatness.

9. *Into what two classes may the arterial method be divided?*—The one-artery method, where one of the main arteries is raised and the entire body injected through it or by the sectional method in which at least five arteries are raised and used for injection.

10. *Describe and give the reasons for each.*—In the one-artery method, either brachial, axillary, ulnar, or femoral artery may be used, although the neatest operation consists in raising the right brachial. The proper procedure in this case is to raise the right brachial artery and insert the embalming needle, tying off both ends of the artery nearest the incision, then raise the basilic vein, insert the venous tube, tie off vein and allow the blood to drain out. Start the injection of the fluid and continue slowly allowing intervals between injections for the fluid to be absorbed by the capillaries. Continue your injection until there is a return of clear fluid through the basilic vein; remove the venous tube tying off the vein both up and down; remove the artery tube tying off the upper section of the artery; reverse the needle and inject down to the right hand. Time need not be lost during the intervals of rest during the process of injection as these intervals give time to shave and fix the mouth and eyes of the subject. The advantage of this method is that it is the easiest and quickest operation and for ordinary cases is dependable for obtaining the desired results.

In the sectional method both brachials are raised and fluid injected down the arm; one carotid raised and fluid injected upward to the head, the needle reversed, and fluid injected toward the heart; also raise both femorals and inject downward. In this method, as in the former, one basilic vein is raised and the venous tube inserted allowing the blood to drain throughout the entire operation. This method in addition to the cavity embalming should be used in all cases where disease or injury has interrupted the circulation and in cases of a post-mortem where circulation has been severed. This method should always be used in the tropics together with cavity work.

11. *How much time should be given to the embalming of a body?*—This varies with the amount of fluid used and the method used. In the one-artery method, about two and one-half hours are required, while in the sectional method from three to four hours are required.

12. *What are the consequences of too rapid injection?*—The first objection is that the fluid is forced through the larger vessels and returned by way of the basilic vein without allowing the fluid to be properly absorbed by the capillaries. Secondly, the blood is forced into the face from where it is not easily removed.

13. *How would you overcome a flushed face?*—Authorities disagree on the methods used to overcome this condition, but in our own opinion the following method is the best, for we have obtained satisfactory results: As soon as the face shows signs of turning blue or dark, stop injection and put all attention to the face. Elevate head and shoulders to allow body to drain. Place a wet towel, as cold as possible, on the face and massage downward. In ordinary cases with a little patience the face will assume its natural appearance, but we have found that the cold towel in Spanish influenza cases is of no avail. The application of hot towels (boiling point) with massage will bring the face back to the natural appearance. Sometimes the discoloration can not be entirely removed and the slight redness that remains can be overcome with a little cosmetic.

14. *When it is desired to preserve a body for the greatest length of time, how would you prepare it?*—By the sectional, cavity, and brain methods.

15. *How would you embalm a body after a post-mortem?*—The method used depends upon the thoroughness of the autopsy. If only a post-mortem on the head, dry out the interior of the skull and fill with a mixture of plaster of Paris and sawdust. Dry the edges of the skull and cement together. Take a stitch in the temporal muscles on each side to hold the skullcap in place. Pull the flaps of the scalp back into place and sew from left to right. If only a thoracic post-mortem, and the circulation is not disturbed, the one artery method can be used with good results. The same method can be used in case of an abdominal autopsy if the circulation is not disturbed. In a complete autopsy the sectional method must be used, as the viscera have either been removed or cut in such a way that it is impossible to get a complete circulation. The sectional method is the only way that the arms, legs, and head can be taken care of. Fill the cavities with sawdust and apply a strong solution of formaldehyde in the cavities. Sew up the incision with the baseball stitch and clean off the subject.

16. *What may cause purging?*—The formation of gas in the intestines or stomach, or too rapid injection of fluid.

17. *How can you tell its source?*—From the nature of the purge. If the purge consists of small bubbles and is reddish in color, it is from the lungs. If it is of a dark-green color and contains particles called "coffee grounds," it is from the stomach.

18. *How can it be overcome?*—By the insertion of a trocar and draining off the fluids and the removal of the gases.

19. *What cases need special treatment?*—Mutilated bodies; drowning; sudden death, such as heart failure, sunstroke, etc.; asphyxia, strangulation, and death by lightning; dropsy.

20. *Give methods used in each case.*—Mutilated bodies: The method used depends upon the extent of mutilation. If an arm has been severed, pick up the opposite artery and proceed to inject as in ordinary cases until a flow of fluid is obtained from the severed arm. Cease injection and tie off the artery and veins to stop the leakage. Inject the severed part of the arm and cover each end of the arm with 36 per cent formalin and secure the two parts together by means of splints and bandages. Pour a little strong solution over the junction so as to prevent decomposition of the severed parts. The same procedure is to be taken in cases of mutilated legs. If the brain is exposed in case of crushed skull, make the opening a little larger, remove any pieces of bone, and push back into the skull any protruding tissues of the brain. Pack into the opening plaster of Paris, and when this hardens it will prevent any leakage of fluid. Sew up the incision and brush back the hair to cover up the incision. In cases where the bones have severed the arteries and it is impossible to get even a partial circulation, the hypodermic method will have to be used.

Drowning: In cases where the body has been in the water only a few hours, place the body on a table, face down, with a block under the chest, and apply pressure to the back and shoulders. This will cause the water to escape from the lungs. Turn over and proceed to embalm by the one-artery method. In this, as in all other asphyxiated cases, the blood will be found in the arteries, and should be removed by raising the femoral artery and inserting a large vein tube with a good-sized hose and have the end of the hose in a blood bottle. Raise the brachial artery and proceed to embalm. When clear fluid is returned through the femoral artery, remove the tube and tie off. Inject the leg downward and tie off. In cases where the body has been in the water for several days and is in an advanced state of decomposition, it is best buried as soon as possible; if not, relieve the gas, remove all water from the lungs, embalm arterially, fill the cavities with strong solution, and do thorough hypodermic work. In cases of decomposition, double-strength fluids should be used, except in the face, where the carotids can be used with a milder fluid.

Sudden death: Heart failure, sunstroke, etc. In these cases, on account of the sudden collapse of the nervous system, the muscles and arteries are in a flabby condition, and the blood, although in a liquid state, is very dark and most likely found in the arteries. Patience and care should be given to the injection, as a rapid injection will cause a darkening of the face.

Dropsy: The various authorities have their own methods for the care of these cases, but a good amount of common sense will help the

embalmer. A good way to remove the water from the tissues is to pick up a large artery and its accompanying vein and inject fluid into the artery, while the vein will carry off water from the blood. Another way is to insert a trocar under the skin on either side of the knee and on each side of the ankle. By massaging the skin downward a quantity of water will be drawn from the limbs. After the body has been embalmed, elevate the head to allow for remaining water to be drained off.

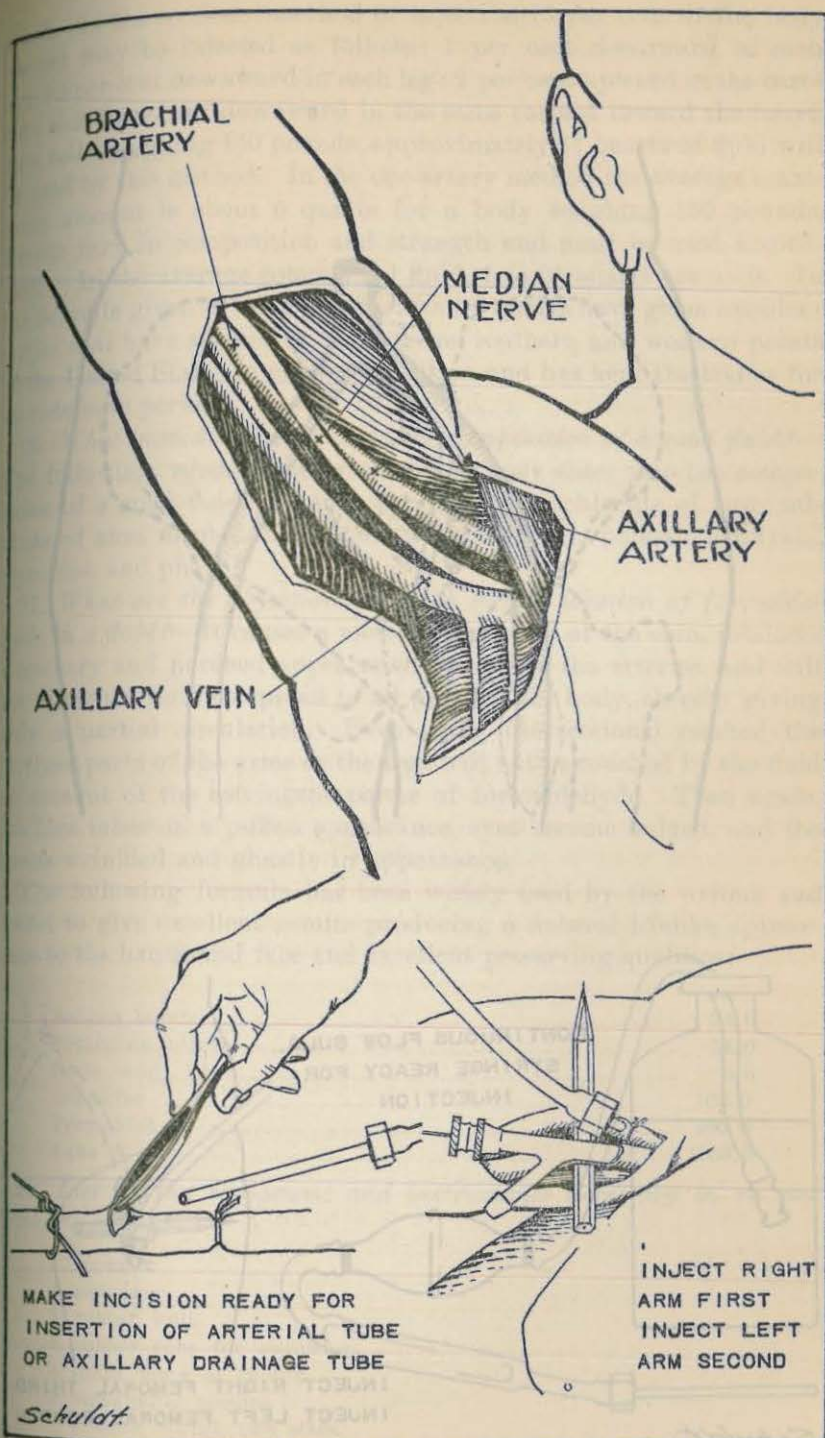
21. *What sanitary precautions should be observed in the preparation of bodies?*—Close all orifices, tie off penis, plug the anus, and wash all bodies with a solution of bichloride from 1-500 to 1-1,000 strength.

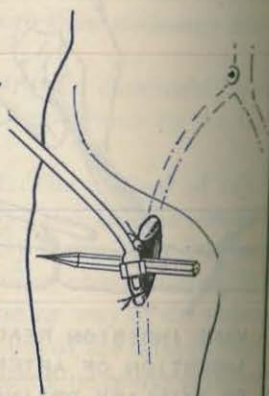
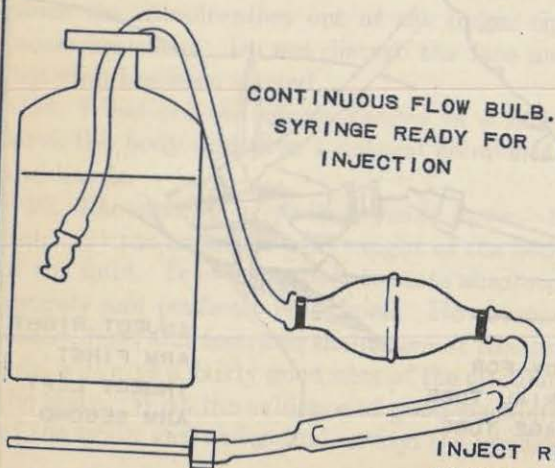
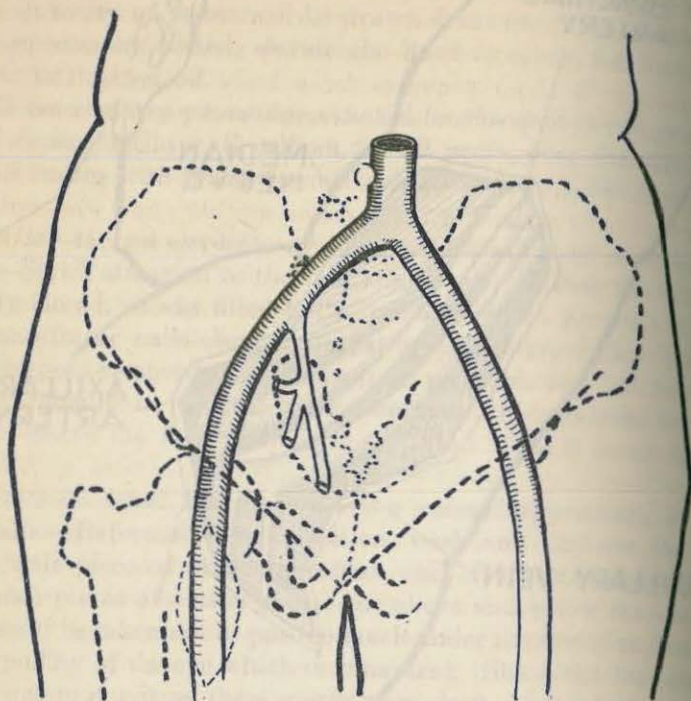
22. *After the preservation of the body, what is of next importance?*—Strict attention to the face and hands, see that the eyes are properly closed, cheeks filled out if needed, mouth properly closed, hands and finger nails cleaned, hair brushed neatly, clothes brushed and any spots removed, shoes shined or polished, and hat brushed. The face should be shaved before starting the injection, as it is easier to shave the face when it is soft than when it is set by the fluid.

23. *State in detail how you secure a natural appearance in face and hands.*—Before starting injection, wash and dry out the eyes with a little piece of gauze or cotton, and if eyes are deep-set fill with small pieces of cotton rolled out above and below the eyeball. Care should be taken not to put too much under the eyelid as this will cause a puffing of the eye which is unnatural. Shave the face and be careful not to cut it as these marks turn dark color when the face dries and are hard to cover up. Close the mouth, and if it will not stay closed take a stitch in the lips, but be careful not to pucker the mouth. Massage the face downward and the hands upward and pinch the discoloration out of the finger tips. Make sure that the hands are clean. Do not disturb the face more than necessary after injection has been started.

24. *What are the effects desired in a fluid?*—To thoroughly preserve the body and give a natural color and appearance to the face and hands.

25. *The amount of fluid depends upon.*—1. The method of injection; (2) the condition and weight of the body; and (3) the strength of the fluid. It is impossible to state absolutely that a body has been entirely and perfectly embalmed. However, close observation of the hands, face, and feet, and the return of the fluid by way of the venous tube will give a fairly good idea of the circulation of the fluid through the body. With the evidence of good circulation plus cavity injection of the brain and abdominal cavity, the operator need not fear for his





Schuldt.

INJECT RIGHT FEMORAL THIRD
INJECT LEFT FEMORAL FOURTH

work. In the sectional method of injection 15 per cent of the body weight may be injected as follows: 1 per cent downward in each arm; 2 per cent downward in each leg; 2 per cent upward in the carotid; and 7 per cent downward in the same carotid toward the heart. In a body weighing 150 pounds, approximately 11 quarts of fluid will be used by this method. In the one-artery method the average maximum amount is about 6 quarts for a body weighing 150 pounds. Fluids vary in composition and strength and must be used accordingly. In the average commercial fluid, 1 to 2½ quarts are used. In the formula given in these papers, about 6 quarts have given excellent bodies that have arrived at the extreme southern and western points of the United States in perfect condition and has kept the bodies for an indefinite period.

26. *What ingredients enter into the composition of a good fluid?*—The following, when properly combined, may enter into the composition of a good fluid: Arsenic, formaldehyde, chloride of zinc, sulphate of zinc, alcohol, boric acid, sodium borate, potassium nitrate, glycerine, and phenol.

27. *What are the objections to a too strong solution of formaldehyde in a fluid?*—It causes a mottled condition of the skin, produces a leathery and parched appearance, constricts the arteries, and will not allow the fluid to spread to all parts of the body, thereby giving only a partial circulation. Even using the sectional method the farthest parts of the arms or the legs will not be touched by the fluid on account of the astringent power of formaldehyde. Then again, the face takes on a puffed appearance, eyes become bulged, and the hands wrinkled and ghastly in appearance.

The following formula has been widely used by the writers and found to give excellent results producing a natural lifelike appearance to the hands and face and excellent preserving qualities:

| | cc. |
|------------------------|--------|
| Sodium borate..... | 24.0 |
| Potassium nitrate..... | 24.0 |
| Boric acid..... | 9.6 |
| Glycerine..... | 100.0 |
| Formaldehyde..... | 100.0 |
| Aqua qs ad..... | 1000.0 |

28. *List of the equipment and instruments necessary in an embalmer's outfit*—

- 1 sponge.
- 1 aspirator.
- 1 rubber bulb.
- 1 rubber tube for aspirator.
- 1 extra piece of tubing.
- 3 embalming needles.
- 2 trocars, metal, two sizes.

2 vein tubes, metal, two sizes.

1 vein tube, hard rubber.

1 rubber tube clamp.

2 pairs of forceps.

1 aneurism needle.

2 scalpels.

1 vein tube, hard rubber, curved.

1 pair scissors.

6 needles, curved.

3 glass bottles, 2 quarts each.

In addition to the above, the following articles will be found of great assistance:

1 groove director.

1 nasal tube, metal.

1 brain tube, metal, curved.

1 hard rubber bridge.

29. *What is the order of a military procession afloat and ashore?*—United States Naval Regulations 1306, 1307, 1308, and 1309 give the following order:

A funeral procession of boats shall move from the ship to the shore in the following order:

Band.

Escort.

Clergy.

Body and body bearers.

Pallbearers.

Mourners from ships of nation of deceased in inverse order, junior ships leading.

Mourners from foreign ships in inverse order, junior ships leading.

Boats may be formed in more than one column if necessary.

A funeral procession ashore shall be formed as follows:

Band.

Escort.

Clergy.

Body and pallbearers.

Body bearers.

Mourners, in inverse order of rank:

(a) Enlisted men.

(b) Officers from ship of deceased.

(c) Other officers.

(d) Foreign officers.

(e) Distinguished persons.

(f) Delegations.

(g) Societies.

(h) Citizens.

Officers and pallbearers shall wear mourning badges on the left arm and the sword hilt. Escort only shall be under arms. The ensigns of all boats shall be displayed in the same manner as the ensigns of their respective ships. The distinctive mark of command, except

that of the deceased, shall not be displayed at half mast from ships or boats. Whatever the grade or rate, the coffin shall be covered with the national flag, and in the case of an officer, the chapeau or cap, epaulets, and side arms of the deceased placed thereon. The national colors carried by the funeral escort shall not be draped except when ordered by the Navy Department for an occasion of national mourning.

On marching to the place of interment the procession shall move in common time; the music shall play a dirge; the ensign and the ship's battalion colors, the latter draped in mourning, shall be carried in the center of the escort, and the drums shall be draped and muffled. In returning from the place of interment the column shall move in quick time and the mourners march in order of rank. When clear of the cemetery the mourning and muffling shall be removed from the battalion colors and the drums and the music shall play a march.

30. *Give the transportation rules of the National Embalmers' Association.*

RULE 1. The transportation of bodies dead of smallpox or bubonic plague from one State, Territory, district, or Province to another is absolutely prohibited.

RULE 2. The transportation of bodies dead of Asiatic cholera, scarlet fever (scarlatina, scarlet rash), yellow fever, typhus fever, diphtheria (membranous croup), erysipelas, glanders, anthrax, or leprosy shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by (a) arterial and cavity injection with an approved disinfecting fluid; (b) disinfecting and stopping of all orifices with absorbent cotton; and (c) washing the body with disinfectant, all of which must be done by an embalmer holding a certificate as such issued by the State or provincial authority provided for by law.

After being disinfected as above, such bodies shall be enveloped in a layer of dry cotton not less than 1 inch thick, completely wrapped in a sheet securely fastened and incased in an air-tight zinc, copper, or lead-lined coffin or casket, all joints and seams hermetically sealed, and all inclosed in a strong, tight, wooden box, or the body prepared for shipment by disinfecting and wrapping as above, may be placed in a strong coffin or casket, incased in an air-tight zinc, copper, or tin lined box, all joints and seams hermetically soldered.

For interstate transportation under this rule only embalmers holding a license by the State or provincial board of health or other State or provincial authority provided by law, after examination, shall be recognized as competent to prepare such bodies for shipment.

RULE 3. Bodies of those dead of typhoid fever, puerperal fever, tuberculosis, or measles may be received for transmission when prepared for shipment by arterial and cavity injection with an approved disinfecting fluid, washing the exterior of the body with the same, and enveloping the entire body with a layer of cotton not less than 1 inch thick, and all wrapped in a sheet, securely fastened and incased in an air-tight, metallic coffin or casket or air-tight metal-lined box,

provided that this shall apply only to bodies which can reach their destination within 30 hours from the time of death.

In all other cases such bodies shall be prepared by a licensed embalmer holding a certificate as provided for in rule 2, when air-tight sealing and bandaging with cotton may be dispensed with.

RULE 4. The bodies of those dead from any cause not stated in rules 2 and 3 may be received for transportation when incased in a sound coffin or casket and inclosed in a strong outside wooden box, provided they can reach their destination within 30 hours from time of death. If the body can not reach its destination within 30 hours from time of death, it must be prepared for shipment by arterial and cavity injection with an approved disinfecting fluid, washing the exterior of the body with the same, and enveloping the entire body with a layer of cotton not less than 1 inch thick, and all wrapped in a sheet securely fastened, and incased in an air-tight metallic coffin or casket or an air-tight metal-lined box. When the body has been prepared for shipment by being thoroughly disinfected by a licensed embalmer, as defined and directed in rule 2, the air-tight sealing and bandaging with cotton may be dispensed with.

RULE 5. In the shipment of bodies dead from any disease named in rule 2, such bodies must not be accompanied by persons or articles which have been exposed to the infection of the disease unless having been certified by the health officer as having been properly disinfected.

Before selling tickets agents should examine carefully the transit permit and note the name of the passenger in charge and of any others proposing to accompany the body and see that all necessary precautions have been taken to prevent the spread of the disease. The transit permit shall in such cases specially state who is authorized by the health authorities to accompany the remains. In all cases where bodies are forwarded under rule 2 notice must be sent by telegraph by the shipping embalmer to the health officer or, when there is no health officer, to other competent authority at destination, advising the date and train on which the body may be expected.

RULE 6. Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a full first-class ticket marked "Corpse" for the transportation of the body and a transit permit showing physician's or coroner's certificate, name of deceased, date and hour of death, age, place of death, cause of death, and all other items of the standard certificate of death recommended by the American Public Health Association and adopted by the United States Census Bureau, as far as obtainable, including health officer's or registrar's permit for removal, whether a communicable or a noncommunicable disease, the point to which the body is to be shipped, and when death is caused by any disease specified in rule 2 the names of those authorized by the health authorities to accompany the body, and the undertaker's statement as to how the body has been prepared for shipment. The transit permit must be made in duplicate, and the signature of the physician or coroner, health officer, and undertaker must be on both the original and duplicate copies. The undertaker's certificate and paster of the original shall be detached from the transit permit and securely fastened on the end of the coffin box. All coffin boxes must be provided with at least four handles. The physician's certificate and transit permit shall be handed to the passenger in charge of the corpse. The whole duplicate copy shall be sent to the official in charge of the baggage department of the initial line and by him to the secretary of the State or provincial board of health of the State or Province from which said shipment is made.

RULE 7. When bodies are shipped by express, a transit permit as described in rule 6, must be made out in duplicate. The undertaker's certificate and poster of the original shall be detached from the transit permit and securely fastened to the coffin box. The physician's certificate and transit permit shall be attached to and accompany the express waybill covering the remains, and be delivered with the body at the point of destination to the person to whom it is consigned. The whole duplicate copy shall be sent by the forwarding express agent to the secretary of state or provincial board of health of the State or Province from which said shipment was made.

RULE 8. Every disinterred body, dead from any disease or cause, shall be treated as infectious or dangerous to the public health, and shall not be accepted for transportation unless said removal has been approved by the State or provincial health authorities having jurisdiction where such body is disinterred, and the consent of the health authorities of the locality to which the corpse is consigned has first been obtained; and all such disinterred remains, of the coffin or casket containing the same, must be wrapped in a woolen blanket thoroughly saturated with a 1-100 solution of corrosive sublimate, and inclosed in a hermetically-soldered zinc, tin, or copper lined box. But bodies deposited in receiving vaults shall not be treated or considered the same as buried bodies, when originally prepared by a licensed embalmer as defined in rule 2 and as directed in rules 2 or 3 (according to the nature of the disease causing death), provided shipment takes place within 30 days from time of death. The shipment of bodies prepared in the manner above directed by licensed embalmers from receiving vaults may be made within 30 days from time of death without having to obtain permission from the health authorities of the locality to which the body is consigned. After 30 days the casket or coffin box containing said body must be inclosed in a hermetically-soldered box.

RULE 9. All rules and parts of rules conflicting with these rules are hereby repealed.

NEW RULES.

At a recent conference of passenger traffic officials and general baggage agents of all the different passenger traffic associations throughout the United States and Canada, the following fundamental rules were adopted:

CORPSES.

RULE 21. (a) A corpse will be checked under an "excess baggage check" indorsed "Corpse" and showing form and number of ticket, and transported in baggage service provided a first-class adult ticket, limited or unlimited, is presented and that portion thereof reading to destination of check surrendered to the baggage agent, who will transmit same with his report to the accounting department of his company; also provided the corpse be accompanied on the same train by an escort. Minimum fare for a one-way ticket for any corpse is \$1.

(b) A corpse will be accepted for transportation only on presentation of legal form of transit permit, properly filled out and signed, showing that the body has been prepared for shipment in accordance with the law.

(c) A corpse will be checked only upon presentation of a regular one-way first-class adult ticket, or the return portion of a first-class adult round-trip ticket.

Exception.—The return portion of a half-fare ticket originally used for the transportation of a child, when presented together with one additional half-fare ticket, will be honored for the checking of the corpse of a child.

The contract and each coupon of a ticket presented for the transportation of a corpse must bear the word "Corpse" written or stamped with ink.

(d) A corpse will not be checked beyond a station at which a wagon transfer is required, except where special authority is given. The escort of the corpse will be required to make all arrangements for such transfer.

(e) When a corpse is checked to a nonagency station the carriers assume no responsibility for the care of the corpse at such destination.

(f) Each corpse box (having not less than six handles) must be plainly marked, showing name of deceased, destination, route, and to whom consigned.

(g) Escort will be required to present a separate ticket for his own transportation; contract and each coupon of the ticket to be marked "Corpse Escort. Excess Check Form —, No. —."

(h) Baggage of the deceased may be checked upon presentation of the corpse ticket in accordance with the rules and regulations herein contained governing the transportation of the baggage of a passenger.

(i) A corpse will not be accepted or transported if it be offensive or if fluids are escaping from the case, notwithstanding the presentations of permits or certificates.

(j) When a casket and dead body presented for shipment in baggage service weighs more than 500 pounds, the excess weight will be charged for at current excess baggage rates.

SIXTY QUESTIONS FROM EXAMINATIONS OF STATE BOARDS OF EMBALMERS OF MASSACHUSETTS, VERMONT, MAINE, AND RHODE ISLAND.

1. Name three cavities and state how the embalmer could reach them.
2. Locate and give guides to (a) femoral, (b) axillary, (c) brachial, (d) carotid, and (e) right common iliac arteries.
3. What is the foramen magnum and what is its function?
4. Where is Poupart's ligament and to what is it attached?
5. Locate Scarpa's triangle.
6. What obstructions does a drop of blood meet in passing from the right auricle to the renal artery?
7. Name five branches of the aorta and the organs that they supply.
8. Give the location and describe the carotid arteries, brachial arteries, and the femoral arteries.
9. What are the capillaries and how would you tell when the embalming fluid circulates through them?
10. What arteries does the fluid pass through from the brachial artery to the heart?
11. How would you distinguish an artery from a vein (explain fully)?
12. What is the superficial fascia? What is the deep fascia?
13. What is the alimentary canal?
14. Name the arteries that supply the liver, spleen, and kidneys.
15. What is the covering of the lungs and what cavities does it make?
16. Locate and describe the diaphragm and the axillary space.
17. What is the weight and size of the heart in a male adult? Which side of the heart receives venous blood? Name the great trunk blood vessels of the heart.
18. Name five arteries used in embalming.
19. What changes take place in the blood after death?
20. Give the location of the heart.

21. Name six infectious and six contagious diseases and tell how they may be communicated.
22. What would be the procedure in removing a disinterred body dead of a contagious disease?
23. What are the effects upon the body of carbolic acid, alcohol, glycerine, creosote, formaldehyde, bichloride of mercury?
24. Give directions for disinfecting a room 12 by 16 by 8.
25. What percentages of cresol, phenol, and bichloride are necessary to kill bacteria?
26. What is the difference between contagious and infectious diseases?
27. How is typhoid fever communicated? Consumption?
28. What organs are infected in typhoid fever?
29. How would you disinfect a room and its contents after a fatal case of scarlet fever?
30. What is the difference between a disinfectant and an antiseptic?
31. What is the object of embalming?
32. Name some chemicals that prevent the coagulation of blood.
33. Give procedure in embalming a post-mortem case.
34. If you use vein tubes and aspirate and don't get blood, what would you do?
35. What is purging? Where does it come from?
36. What would you do with a case where the body was crushed or burned and the arteries and cavities could not be used or injected?
37. In a dropsical case where the whole body is involved, how would you embalm it?
38. Why do you inject arteries instead of veins?
39. Would you remove blood before or after injection?
40. What condition or cause of death will prevent complete circulation?
41. How do you determine purge from the stomach from that of the lungs?
42. When the heart has been removed by post mortem, what vessels should be ligated to prevent the loss of blood when injecting the arteries?
43. Can a body be embalmed after removing the heart? How would you proceed?
44. What methods have you been taught for drawing blood and how much blood would you expect to get from a body weighing 150 pounds.
45. Is cavity embalming always necessary?
46. If, on injecting a body, one side of the face is bleached, the other not bleached, give causes and remedies.
47. Why not use a 25 per cent solution of formaldehyde? Name a chemical that will neutralize formaldehyde. How would you make a 10 per cent solution of formaldehyde?
48. Is it advisable to draw blood in all cases?
49. How do you wash the arterial system?
50. If a face is discolored and you wish to wash it out what arteries would you use?
51. Name and locate arteries used in embalming and tell fully how you would raise same. Name instruments that you would use.
52. How do you determine the amount of fluid to be used to embalm a body?
53. What causes discoloration?
54. How would you embalm a body after a complete autopsy?
55. If there is a purging of blood from the mouth while you are embalming, what does it indicate?
56. What is rigor mortis? How soon after death does it set in? How is rigor mortis broken up?
57. Name six ingredients that may be used in embalming fluids.

58. Under what conditions and in what cases would you use the hypodermic method of embalming?
 59. What bodies are prohibited from transportation?
 60. What bodies may be transported under rule No. 3?

ORAL SURGERY.

By Dr. THOMAS B. HARTSELL, College of Dentistry, University of Minnesota.

What are the important bacteria found in the mouth?—In the order of their importance, they are the streptococcus viridans, the staphylococcus albus, aureus, and citreus, the pneumococcus, and the fusiform bacillus.

Of what importance is the streptococcus?—The streptococcus, which forms about one-half of all the bacterial growths in the mouth, is the proved cause of heart disease, some forms of kidney disease, and rheumatism. Locally about the teeth, it causes gingivitis (evidenced by bleeding gums) and granulomata, and it is through the medium of the bleeding gum and the chronic granuloma that it invades the blood stream, thus causing heart, kidney, and joint infections. It further invades the substance of the tooth and helps to make cavities through its intense activity, producing acids which decalcify tooth structure. The streptococcus is also the organism responsible for acute streptococcal pneumonias.

Of what importance is the staphylococcus in the mouth?—The staphylococcus is the germ of suppuration. It is the bacterium which creates the pus in pyorrhea. It is the germ which makes the acute dental abscess—the abscess in which the face swells swiftly and becomes increasingly painful as the swelling increases.

Of what importance is the pneumococcus?—The pneumococcus, which is constantly found in the mouth, is not destructive to the tissues of the mouth locally, but, through the medium of pyorrhea pockets and tonsil crypts, it may gain access to the blood stream and cause acute pneumonias.

Of what importance is the fusiform bacillus?—The fusiform bacillus is also a constant inhabitant of the tooth surfaces. It lives on dead and dying tissue, and when the gum crevice and tissues adjacent to the teeth have been invaded by the streptococcus and staphylococcus, it may gain a foothold and cause acute inflammation of those tissues, with very rapid destruction, oftentimes laying bare the bony process supporting the tooth.

How can we limit the harm done to the teeth and body by these common mouth organisms?—By vigorous, careful cleansing of the tooth surfaces, rubbing them with toothbrushes five to eight min-



Instruction in extracting teeth.



utes daily, together with a sufficient amount of massage of the gums to check bleeding.

When the gums in the mouth bleed, what should we do?—We should immediately rub the teeth clean, until they shine, and rub the gums vigorously two or three times daily with 10 per cent salt solution applied with a toothbrush until the bleeding ceases. All heavy movements of the brush should be from the apex of the root toward the crown of the tooth. All light movements may be made in any direction.

How much time does it require daily on the part of the individual to maintain a moderately clean mouth?—Five minutes night and morning.

What should be the gauge of force applied in the cleansing of tooth surfaces?—Do not break the toothbrush.

What are the advantages of a clean mouth?—Longer life, greater strength, comparative freedom from heart disease, pneumonia, joint infections, and kidney inflammations.

PRINCIPLES OF ORAL SURGERY.

By Dr. ARTHUR A. ZIEROLD, College of Dentistry, University of Minnesota.

How does surgery of the mouth and jaws differ from general surgery?—General surgery is usually aseptic surgery—i. e., by careful sterilization of the operative field and towels, hands, instruments, etc., bacteria are excluded from the wound. In surgery of the mouth the field can not be rendered sterile, hence antiseptic chemicals are used to reduce the numbers of bacteria which unavoidably gain entrance into the wound.

Can the mouth be rendered sterile?—No; not without doing irreparable damage to the soft tissues.

How is the mouth prepared for operation?—Preliminary care: Remove all deposits and irritants; polish the teeth; apply 3 per cent iodine liberally twice daily for three days previous to the operation. Scrub the mouth and teeth with soap and water. Block salivary ducts with cotton tampons. Isolate the operative field with gauze or towels. Dry operative field. Apply 3 per cent iodine and allow to dry.

What is the postoperative care of mouth and jaw surgery?—Local: Spray with H_2O_2 to remove epithelial and food débris morning and night. For two days following operation use hot 10 per cent salt solution as irrigation every half to two hours, depending on the severity of the case. If too painful reduce to 5 per cent. Irrigate for several minutes. If the wound shows deep-seated infection, remove stitches to obtain drainage. If stitches are infected and cut-

ting badly, remove at once. Secondary hemorrhage should be watched for and reported at once.

General: Increase the fluid intake by mouth or rectum. Feed by mouth through a tube or per rectum if necessary. Diet: meat broths, milk, eggs, etc. Control temperature by sponge baths or packs, if possible.

How is hemorrhage in the mouth controlled?—In the soft parts, tampons of gauze or cotton wet in hot 5 per cent salt solution rolled hard and pressed firmly into the wound will stop bleeding of the smaller vessels. This must be bandaged tightly. Large vessels must be clamped and tied. Wounds of the mouth should be carefully watched for secondary hemorrhage. Hemorrhage in bone may be controlled by pressure with lightly rolled cotton or bone wax.

What is syncope?—Syncope is a sudden suspension of consciousness attended by more or less complete loss of heart action and lessened respiratory function.

What are the causes of syncope?—Hemorrhage, emotion (fright, etc.), lowered CO_2 tension in blood, beginning nitrous oxide anesthesia, altitude, etc.

What are the symptoms of syncope?—Sudden onset, disinclination to talk, vertigo, amaurosis, pallor (may or may not be present), pupils dilated, respiration slow and shallow, pulse weak or absent, loss of consciousness.

What is the duration of syncope?—Usually from a few seconds to a few minutes.

What is the treatment of syncope?—Head lower than the rest of the body, dilation of the rectal sphincter (rarely necessary); 2 to 4 c. c. of aromatic spirits of ammonia in a little water may be given if the patient is conscious.

What is shock?—Shock is a symptom-complex consisting of pallor, slow, shallow respiration, rapid pulse, apathy, decreased sensibility, low pulse pressure, and loss of muscle tonus.

What is the cause of shock?—Injury to large nerve trunks, to spine, to head; loss of blood, severe burns, exhaustion, fear, sepsis.

What is the treatment of shock?—Absolute physiological rest; warmth (hot-water bags, etc.); adrenalin, 1=100,000, intravenously. (Do not attempt to bring the blood pressure to normal, but to about 20 or 30 m. m. below.)

ANESTHESIA.

By Dr. K. PAUL CARSON, College of Dentistry, University of Minnesota.

Define anesthesia.—The term anesthesia is employed to designate a state of insensibility to pain, with or without unconsciousness and induced by hypnotics or drugs.

Define general anesthesia.—By general anesthesia is meant a state of unconsciousness concurrent with insensibility to pain.

How is it obtained?—It is usually brought about by inhalation, but may be obtained by various agencies introduced into the organism by other channels than the respiratory system.

Drugs used.—Nitrous oxide, ether, ethyl chloride, chloroform, combinations and sequences of the above with each other and with oxygen.

Define local anesthesia.—By the term local anesthesia is meant the abolition of sensibility to pain in a given area without the loss of consciousness.

How is it obtained?—Local anesthesia is produced by inhibiting the function of the sensory nerve fibers in their course (nerve blocking) or at their peripheral endorgans (infiltration, refrigeration).

Drugs used.—Cocaine hydrochloride, novocaine hydrochloride, and alypin are the drugs generally employed hypodermatically. The ethyl chloride spray produces local anesthesia by refrigeration.

What general and what local anesthetic is chiefly used in dentistry?—Among general anesthetics nitrous oxide with air or with oxygen is employed almost entirely. Novocaine hydrochloride with adrenalin or with synthetic suprarenin is the local anesthetic of preference.

Mention indications and contraindications in the use of nitrous oxide.—Nitrous oxide, given with air or with air and oxygen, is considered the safest of general anesthetics. When the nitrous oxide is heated and supplemented by warmed moist ether, when necessary, we have the best form of anesthesia, considered from every standpoint, available to-day. Nitrous oxide is the recognized anesthetic for the extraction of teeth, for dislocations, reducing fractures, opening abscesses, in fact, for all short operations, except where there is any great swelling or engorgement of the neck. Nitrous oxide is contraindicated for very young children, for elderly people, for patients with heart lesions, for athletes, drug habitués, and alcoholics. Nitrous oxide alone is never indicated.

Mention indications and contraindications in the use of novocaine-adrenalin.—Novocaine is indicated practically wherever a local anesthetic is indicated. It is much safer than any other similar drug. It has been estimated to be from one-seventh to one-tenth as toxic as cocaine. Except where a patient appears to be in a condition which indicates general systemic derangement, is hysterical, has a noticeable cardiac lesion or is suffering from arteriosclerosis with a high blood pressure, novocaine can be used with safety.

Describe physiologic action, therapeutics, and dosage of novocaine hydrochloride.—Novocaine does not irritate in the slightest degree when injected; consequently no pain is felt from its introduction into

the tissue. When injected beneath the skin or mucous membrane it exerts a prompt and profound local anesthetic action. Novocaine is soluble in its own weight of water, combines with adrenalin in any proportion, without interfering with the physiological action of the latter. As a matter of fact, a given quantity of novocaine-adrenalin, when injected, produces a greater therapeutic effect than is required of each individual drug. Due to the vaso-constrictor action of the adrenalin, the novocaine is usually confined to the injected area; general effects are therefore rarely produced. The dosage of novocaine is about one-third of a grain in a $1\frac{1}{2}$ or 2 per cent solution.

Describe the preparation of an isotonic 2 per cent solution of novocaine-adrenalin or novocaine-suprarenin.

| | | |
|--------------------------|------------|-------|
| Novocaine | grams .. | 2.0 |
| Sodium chloride | do | 0.5 |
| Calcium chloride | do | 0.04 |
| Potassium chloride | do | 0.02 |
| Distilled water | c. c. | 100.0 |

To each cubic centimeter of above solution add one drop of a $1/1000$ adrenalin chloride when used. Solutions for hypodermic use should preferably be made fresh when needed, and tablets of convenient form are popular for dental purposes. The formula for the so-called "E" tablet follows:

| | | |
|------------------|----------|---------|
| Novocaine | gram .. | 0.04 |
| Suprarenin | do | 0.00005 |

The physiological salt solution can be taken either from a stock flask or else can be made up each time by dissolving one Ringer tablet in 10 cubic centimeters of sterile distilled water.

Ringer solution:

| | | |
|--------------------------|------------|-------|
| Sodium chloride | grams .. | 0.5 |
| Calcium chloride | do | 0.04 |
| Potassium chloride | do | 0.02 |
| Distilled water | c. c. | 100.0 |

The quantity of sterile Ringer solution required in a given case is poured into a test tube or suitable porcelain receptacle, boiled for a few seconds, when to each cubic centimeter of solution one "E" tablet is added, again bringing the contents to the boiling point. Care must be taken not to boil the solution too long at this stage, as excessive heat destroys the active principle of the suprarenin. The best method for making a small quantity of novocaine-suprarenin of a 2 per cent concentration consists of boiling about 12 cubic centimeters of distilled water for three or five minutes, when the water in excess of 10 cubic centimeters is poured off, one Ringer tablet added, and the solution boiled again until tablet has been dissolved. As it is necessary to have a syringe sterile and free from any alcohol or other antiseptic solution prior to filling same with the anesthetic, part of the boiled Ringer solution can be used for the purpose of thoroughly freeing the syringe from above-mentioned antiseptics. If 4 cubic centimeters of novocaine is desired, draw the other 6 through the syringe. To the remaining quantity add four "E" tablets if a 2 per cent solution is to be used, three tablets for a $1\frac{1}{2}$ per cent solution, two tablets for a 1 per cent solution, and so on.

Give the important steps to be followed prior to the injection.—Attention must be paid to the maintenance of the strictest asepsis, as serious consequences may result from neglect of one of the factors involved. It is imperative to sterilize not only the instruments, the solution, and the operator's hands before making the injection, but the oral mucosa, which is always infected, must also be subjected to a thorough sterilization. This is done first by allowing the patient to rinse the mouth with water, second with sponges, wiping off saliva over area to be punctured, and third by the application of iodine in some form, such as tincture of a 3 per cent strength; equal parts of the tincture of iodine and aconite or Lugol's iodine. The painting with iodine is accomplished not merely by applying it on cotton with a light touch, but by means of a swab, repeatedly wiping the tissue to and from, thus combining mechanical cleansing with disinfection and also effecting penetration. Before puncturing the tissue be certain that the syringe is free from air bubbles, as an air embolus in the circulatory system may produce death in a few minutes. Never inject into tendinous, muscular, inflamed, or congested tissue, nor into a pus pocket.

Name the various injections.—Subperiosteal, tuberosity, infraorbital, mandibular, and mental.

Describe each.—Subperiosteal anesthesia, also called regional, terminal, or infiltration anesthesia, is brought about by injecting the fluid into the tissue directly over the bone of the tooth or teeth to be operated upon. The success of this form of anesthesia depends upon the penetration of the anesthesia into the spongy portion of the bone, thus reaching the contained nerves. In the adult subperiosteal injections can be used with good results for all operations on teeth of the upper jaw, as well as for the six lower anterior teeth. Distinction must be made between subperiosteal and infiltration anesthesia in the injections used in conjunction with nerve blocking, for the control of mucous membrane and periosteum of palate; buccally to the lower first, second, and third molars and for all anastomosing branches. Injection beneath the periosteum is here contraindicated. In children subperiosteal anesthesia is efficient for operations on all teeth of both the upper and the lower jaw.

About the root of a tooth this injection is best started by inserting the needle midway between the gingival margin and approximate location of the apex. The syringe is held like a pen; the needle is placed at an almost right angle with the tissue. After piercing the mucosa and the periosteum the needle is inclined so as to form an acute angle with the long axis of the tooth, taking care that the orifice of the needle points toward the bone. The needle is then slowly forced apically along the alveolar process and the solution gradually deposited in quantities from a half to one cubic centimeter.

A similar injection on the lingual surface is necessary if the tooth is to be extracted, discharging from one-quarter to one-half cubic centimeter of the solution. When anesthesia of two or more teeth is desired, the technique differs from the above. Taking as an example the two upper bicuspid, the needle is inserted near the apex of the cuspid, directed posteriorly across the ends of the bicuspid to a point near the mesio-buccal root of the upper first molar, injecting about 2 cubic centimeters along the path of the needle.

The tuberosity injection is used for blocking the posterior superior alveolar branches of the superior maxillary nerve. These branches supply the upper second and third molars and part of the first. Insert the needle in the cheek fold at a point near the apex of the distal root of the upper second molar, somewhat away from the bone, directing it upward, backward, and inward to a depth of about 2 centimeters, keeping the needle as close as possible to the slightly convex tuberosity. Inject from 1 to 2 cubic centimeters of the solution. The lingual or palatal injection for these teeth is made by inserting the needle at a right angle with the tissue, midway between the gum margin and the median line in the region of the last erupted molar. At a depth of 1 centimeter deposit one quarter cubic centimeter of solution. The infraorbital injection blocks the anterior superior alveolar branches of the infraorbital nerve, which is the continuation of the superior maxillary nerve. These branches supply the six upper anterior teeth. The lower border of the orbit is palpated and the tissue overlying the infraorbital foramen is compressed with the thumb of the left hand, at the same time drawing the lip upward and away from the gum with the third finger. The infraorbital foramen is situated in most cases from 5 to 10 millimeters below the lower border of the orbit, on a straight line from the pupil of the eye to the apex of the first or second bicuspid. The needle is inserted in the reflection of the mucous membrane over the first or second bicuspid, somewhat away from the maxilla and advanced in the direction of the pupil of the eye until the point of the needle is felt beneath the compressing finger tip. Here inject from one-half to 1 cubic centimeter of the solution. Following the injection, gentle massage over the foramen is applied to good advantage. Palatally, the injection is not made in the incisive papillae, where the insertion of a needle is extremely painful, but directly over the roots of the teeth to be anesthetized and about 1 centimeter from the gum margin. For palatal anesthesia of the central, lateral, and cuspid on one side, it is unnecessary to make an injection over root apex of the lateral.

The mandibular or inferior dental foramen, situated on the internal surface of the ascending ramus, permits the passage of the inferior dental nerve, which, with the inferior dental artery, passes forward through the mandibular canal as far as the mental foramen,

where it divides into the incisor and mental branches. The inferior dental nerve, the lingual, and the long buccal nerves are all given off from the inferior maxillary nerve. Each inferior dental nerve supplies all the lower teeth on one side as well as the mucous membrane and the periosteum from the median line to the region of the first molar, the remainder being supplied by the long buccal nerve in the majority of cases. The lingual mucous membrane and periosteum receives its nerve supply from the lingual nerve. The patient is requested to hold the head straight and to open the mouth wide. With the index finger of the left of the free hand the anterior border of the base of the ascending ramus is palpated. Two bony ridges are felt here, the external and the internal oblique lines, the former being more marked generally than the latter. Between these two lines, at the base of the ascending ramus, a shallow bony groove is situated, the retro-molar fossa, into which the palpating finger sinks slightly. Over this bony fossa the mucous membrane is depressed so as to form a sort of a triangle the retro-molar triangle. The internal oblique line is fixed with the finger tip, the needle inserted into the mucous triangle, near the internal oblique line and about 1 centimeter above the occlusal surfaces of the molars. In children the needle is inserted a little farther posteriorly and slightly lower, in the aged higher up. The needle is then advanced horizontally, backward and outward along the inner surface of the ascending ramus, which course, as a rule, brings the barrel of the syringe to a point between the cuspid and the second bicuspid on the opposite side. The point of the needle should not be carried to a greater depth than from $1\frac{1}{2}$ to 2 centimeters. The solution should be discharged slowly and carefully, beginning immediately after insertion of the needle, so as to anesthetize simultaneously the lingual nerve, which descends in front of the inferior dental nerve. The bulk of the solution usually, 2 cubic centimeters of a $1\frac{1}{2}$ per cent concentration, is deposited when the full depth of the needle point has been reached. If necessary, inject about one-quarter of 1 cubic centimeter in the buccal mucosa overlying the molar to be operated on. Anteriorly to the first molar, buccal injection is unnecessary. The mental injection, if made on one side, anesthetizes the two bicuspid and sometimes the cuspid on that side. When both foramina are injected, anesthesia of the lower 10 anterior teeth ensues. The mental foramen is situated, generally, just below and between the apices of the lower first and second bicuspid. To make the injection it is best to stand behind the patient. The needle is inserted just distally to the second bicuspid, half way between the gingival margin and the lower border of the mandible, directed downward, forward, and inward to the mental foramen, avoiding the periosteum except at the foramen, where from one-half to 1 cubic centimeter is injected. Massage, as in the

infraorbital injection is indicated. If the teeth are to be removed, it will be necessary to infiltrate the mucosa lingually to the second bicuspid advancing the needle parallel with the bone to a point slightly beyond the root apex, gradually discharging from one-half to 1 cubic centimeter of the solution and avoiding penetration of the periosteum.

Anesthesia by way of the mental foramen is important as an accessory, and it can be advantageously employed for paralyzing the anastomosis of the opposite side.

A TRIP TO ALASKA.

By P. F. DICKENS, Lieutenant, Medical Corps, United States Navy.

NAVAL VESSELS ARE ORDERED TO ALASKA.

[From "Ledger Dispatch," Mar. 26, 1919. Norfolk, Va.]

WASHINGTON, March 26.

Assignment of a number of naval vessels to Alaskan waters for the summer season to enforce laws, assist vessels and natives in distress, and for other purposes, was announced by Acting Secretary Roosevelt.

Four submarine chasers, with the gunboat *Vicksburg* as a mother ship, will leave Puget Sound about April 1 for Juneau, from which they will operate until navigation closes. This detachment will have on board fish wardens of the Department of Commerce and will be ordered to cooperate with officials of that department and the Treasury and Interior Departments in enforcing laws and aiding shipping and natives.

The coast guard cutters *Unalga* and *Bear*, operating under orders of the commodore commandant of the coast guard, also will operate in Alaskan waters from about April 20 to October 1. The patrol of these vessels will be similar to that which has been maintained by the coast guard for several years.

The radio repair ship *Saturn* will leave San Francisco about April 15 for her annual cruise in Alaskan waters. Her itinerary will include a visit to Dutch Harbor, Pribilof Islands, Kodiak, and thence back to San Francisco, to repeat the same cruise before the end of October. This vessel will visit all the radio stations in Alaska for the purpose of repairing material, relieving the personnel, and delivering the necessary supplies and equipment to keep the stations operating during the winter.

Doesn't the above heading fascinate you? Haven't you, ever since you studied geography in school, wanted to take a trip into the far frozen north, the land of long nights and long days, glaciers, icebergs, and frozen rivers? You, of course, did your dreaming as a civilian, never thinking that the opportunity would present itself for you to see the historic points of interest in our northernmost Territory, but now that you are in the service a trip of this sort does not seem to excite your imagination nor create the desire it did when you were a civilian and in all probability unable to cut loose from your business and make the trip for pleasure, or perhaps you may have taken trips

somewhere else, but *don't let this deter you in your determination to make this trip if possible.*

The writer had the exceptional opportunity of making two trips to Alaska, the Bering Sea, and the Aleutian Islands, also of visiting the seal rookeries in the Pribilof Islands. This is one of the many trips made possible by being a hospital corpsman in the Navy, and if you are one of the lucky ones who have a trip of this kind come their way, go with your eyes and ears open as a sightseer with an educational viewpoint, and by all means let the kodak be a friend of yours.

While serving on board the U. S. S. *Buffalo* rumor had it that the ship was to make an annual cruise to Alaska, and on the morning of May 7, 1914, we pulled out of the Golden Gate, the entrance to San Francisco Bay, and started northward bound. A trip into a new land always holds many thrills, even to an old sea dog, and each lap of our journey meant the realization of my dreams, only many times magnified beyond the most fertile imagination.

Our first stop was at the historic town of Unalaska (Dutch Harbor), located on one of the islands of the Aleutian group. It is commencing to show the ravages of time, but during the gold rush to Alaska this isolated community was the stopping point for those going to and those returning from the Yukon. The large hotels, which are fast falling into decay or are being used as storehouses, could tell many a tale of the high hopes and disappointments of those who won or lost the rugged battles of the Yukon. Many and many a fortune has changed hands over the gambling tables of this one-time miniature Monte Carlo, the land of no laws. By using the imagination just a little you can see almost a veritable "Tower of Babel," for all the races of the earth passed through this village to their Mecca in the far north.

It is a far reach, however, from the gold-rush days to the present day, and now Unalaska is a very small village, numbering some three or four hundred inhabitants, two or three hundred of them being natives, and the hotels, bars, and gambling dens are but silent reminders of a vivid past.

Just back of the town is a hill called "Ballyhoo Hill" and on top of this hill the earlier travelers erected a copper box which contains a large book and in this book those people who have the energy to climb the hill are allowed to write their names. This book contains the names of several men who are now not only directing the destiny of this Nation but of other nations. Among the names the writer found were those of several naval officers at that time young, but who since have risen to the rank of rear admiral and who have had their names written in history. Also there were the names of men who have since climbed the political ladder and reached the top. This

hill is not exceptionally hard to ascend, although in places it is quite steep, but the descent is much more difficult.

In the immediate vicinity of this village is available some of the best caribou hunting in the world. It is also at this port that vessels of those who prey on the seals and apply unlawful fishing methods are corralled and destroyed both by the Navy and by the Coast Guard Service.

From this point we went to St. Pauls Island of the Pribilof group, and the writer had his first view of the most famous fur-seal rookery in the world. On our arrival the seals were just commencing to come out of the water for their summer airing and to see a rookery "swarming" is a truly interesting sight. The bull seals leave the water first and take charge of a plot of ground some 30 feet square, with an imaginary boundary, and woe to any other bull seal who attempts to invade the sacred precincts. These bull seals fight and capture as many of the cow seals as possible. Generally speaking, each bull seal will establish a harem of some four to six cows. To the strongest and best fighter go the spoils of war, which always include the more beautiful cow seals. The young female and bachelor seals establish their kindergarten at some other point of the island.

It is at the rookery that the young seals are born and they remain in their home until summer begins to wane, about the latter part of July or the 1st of August. By this time the old bull seals, who were sleek and fat when they arrived from the water, are "nothing but skin and bone," and the cow seals take them and their young into the water and protect them until they can protect themselves. It is not known whither the fur seals migrate when they return to the water, but they always return to their rookery the following year. At the present time the Government has made certain laws for the protection of the seals, and it is for the enforcing of these laws that a number of our Coast Guard vessels are detailed for duty in these waters. There is established on this island a Navy wireless station and a Department of the Interior (Bureau of Fisheries) station.

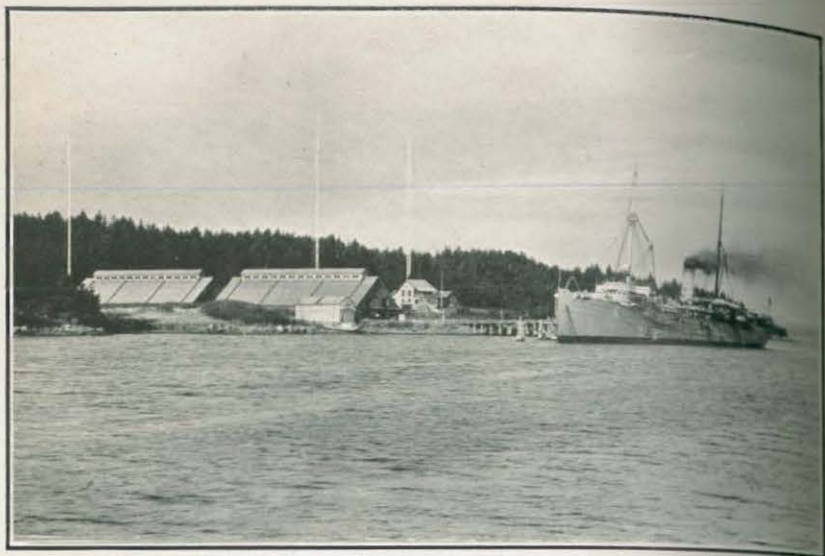
St. Paul is a small town of some 200 inhabitants, and outside of Navy and other Government activities they are mostly natives. It is understood that the natives are allowed to kill a certain number of the young bachelor seals each year for sustenance during the winter, and it is here that I saw my first seal or fish skin boat.

From this point, on account of the arriving ice, we went south and stopped for 24 hours at St. Georges Island, a few miles from St. Pauls Island. The Navy Department has established a small wireless station at this point.

The commanding officer took our vessels from St. Georges Island to Unalga, Alaska, where the Navy has another wireless station. This



Totem poles, Alaska.



The U. S. S. "Buffalo" at Sitka, Alaska.



Old Greek church, Sitka, Alaska.

is a decidedly unique station, in view of the fact that the only inhabitants were those of the Navy personnel operating the wireless. It is here that a small mail boat puts in once a month, during the summer season only, with mail and supplies.

From here we went to Kodiak, Alaska, on Kodiak Island, the home of the famous Kodiak bear and we found on exhibition bear-skins of enormous size. Kodiak is a rather interesting little burgh, and among the various forms of plant life is found what is called the "salmon berry," which is large, luscious, and decidedly edible. The climate is not severe and during the summer months an attempt is made at agriculture, viz, the raising of hay and other quick-growing products, and here there are several salmon canning factories where one can obtain fish in abundance. In fact, the whole Bering Sea seems to swarm with fish.

From this place we went to Cordova, one of the most enterprising cities on the coast. The Navy maintains a very large wireless station here, and it is at this point that the Copper River empties into the Pacific Ocean. Cordova is also the terminus of the famous Copper River Railroad, which taps the mines and coal fields in the interior.

We turned south from Cordova toward the historic town of Sitka, which was at one time the capital of Alaska. Sitka has many relics of the Russian régime and at the same time could be called a "City of Totem Poles." In fact, there is a veritable forest of them within easy walking distance of the city. One of the historic buildings of old Russian trading post days is the Greek Catholic church, which has recently been renovated. In this church they have a famous picture of the Virgin in which the halo and yellow tones instead of being painted are inlaid gold.

We also found that there are other sphinxes in the world besides the one in Egypt, for there is the famous Ophit Sphinx of Alaska. However, this carving was done by nature. It gives a very picturesque silhouette.

The history of Sitka has been written in blood. The natives when not warring with one another were warring with the Government whose laws controlled them and a number of battles were fought on water and might be called naval battles. However, the battle was probably fought with oars, no doubt with loss of life and the destruction of property.

At this place there is an agricultural experimental station which is a wonder. Strawberries are raised in abundance and they are large and most luscious.

From this point the *Buffalo* returned to the United States, and it was not until a year later that the writer retraced his steps, but at

this time on a different class of vessel, viz, one of the vessels of the torpedo-boat division of the Pacific Fleet, and we had pleasure interspersed with duty. On account of these boats being small, it was necessary to stop often for supplies, which gave the personnel an opportunity to get back to nature and hunt and fish to their heart's content. The streams are short, shallow, and narrow, their sources usually being the melting snow fields of the near-by mountain ranges. It is to these streams that the salmon go to fresh water to spawn, and the young salmon are delicious eating and easily caught with a hook. In the summer time the temperature is very agreeable, never being what might be called warm. The ground is never free from snow, however, but one does not seem to be as cold as the temperature would indicate. On this trip the ship took in most of the islands of the Aleutian group, and at all of them we found wonderful fishing and hunting. In fact, the carcass of a deer could be bought for from \$1.25 to \$2.50, according to the size, so the ship's company never wanted for a variety of food.

A trip of this nature on torpedo boats, of course, is not all pleasure, because they are quite a distance from their base of supplies and the sea sometimes treats them quite roughly. On the boat on which the writer was serving, seas came over the deck and swept the ice box overboard along with extra provisions, necessitating the procuring of supplies as best we could. It was on this trip that we witnessed the unusual sight of a boat harpooning a whale and finally making the capture.

While the trip was in reality a business trip in the line of surveying, it was not all work and no play, but one can readily realize that these small boats burning coal must be refueled often. All hands always turned to, and the task was soon accomplished and the crew had a period of leisure.

On this trip the ship covered nearly the same course as the previous year with the exception of a visit to the city of Juneau, the capital of Alaska, and here one of the larger mining companies invited the crews of the vessels to visit their mines, one of which was located on a mountain side at the edge of the water and it was inspiring to go several hundred feet below the sea and watch the miners at work. One of the most pleasing features of the entire trip was the cordial reception tendered the crews by the inhabitants of all the towns visited. We also stopped at Near Island, from which point it is but a short run to Okhotsh Sea, Siberia, just north of Japan.

The return trip was also varied by using the Inland Passage. It is impossible to describe, in writing, the scenes encountered in this waterway, but imagine if you can hundreds of rugged islands, pine clad and snow covered, rising straight from the water's edge. Winding among them are tortuous channels, some of them so narrow

Supplement to Naval Medical Bulletin, July, 1919.



View of Unalaska, Dutch Harbor, Alaska.



that one can almost reach out and touch the mountain sides. As a rule, this inland passage is very calm and the reflections are magnificent. Sunset is the time when a lover of nature and beauty gets his shock. Everything is quiet as the boat slowly picks her course through the narrow channels and you have a feeling that something wonderful is to happen. Gradually you can see slow mists curl around you; the sky assumes gorgeous hues; the snow-topped peaks take on fleckings of color and before you know it, you are enveloped in a cloud of color which turns the boat, people's faces, and everything around you the color of the tint. You are fairly speechless with the wonder of it. Gradually, as the sun sinks lower and lower the mists rise (just as the curtain at a theater), and again you have before you all the wonders of mountain and sea.

During a trip to Alaska one encounters the phenomenon of the sun setting about 10 o'clock at night and rising about 3 a. m. In fact, one of your troubles in attempting to go to sleep in what should be nighttime, with the sun shining through the porthole is that after you have snatched a wink of sleep "Old Sol" sends you a greeting in the wee small hours.

If one had to stay up for "colors" at sunset, as is ordinarily done in the Navy, he would not get much sleep, but the commanding officers of vessels generally set an hour at which the flag is lowered.

Another "thriller" you will encounter is the aurora borealis with its million shooting rays of brilliant color.

This should be called the frontier country of America for the inhabitants are very democratic and the latchstring is always on the outside. Supplies of all sorts are not nearly so high as a person would suppose and are oftentimes paid for in some ore which has its standard local value, and if one goes farther north he will see that race of people so often read about, the Esquimaux. Especially is this true in the interior, where they are encountered with their dog teams and reindeer sleds.

What could be offered by the Navy Department better than a trip to Alaskan waters?

AN INTRODUCTION TO THE STUDY OF ECONOMICS.

By CHESTER ARTHUR PHILLIPS, Assistant Professor of Economics in Dartmouth College.

Economics is the study of society in its wealth-getting and wealth-using activities. The economist endeavors to discover how wealth is produced, exchanged, distributed among the producers, and consumed. The economist as such has nothing to do with statesmanship, social philosophy, or morals, just as the mathematician has nothing to do with mechanics and the physiologist nothing to do with the

application of curative medicine. The economist may also be a social philosopher, a moralist, or a statesman, just as the mathematician may also be an astronomer or civil engineer; but, not for that reason, should the several subjects be confused. The economist is a teacher, not a preacher, an investigator and expositor, but not an advocate. Economics discovers and formulates and interprets principles; their application belongs to the realms of political science, ethics, law.

Economics is the science of wealth, but what is wealth? It may be defined as material objects that are owned. Its attributes are materiality and ownership. A diamond is wealth, being both material and owned. The glitter of a diamond is not wealth, being neither material nor owned. Water under conditions of scarcity is appropriated and, being material, is wealth. When water is so abundant that no one unit has utility or desirability it likewise is not owned and is not wealth. A gold coin satisfies the requirements of our definition; but a gold certificate, which is the representative of the coin, lacks materiality and is not wealth. A farm is wealth; a mortgage on the farm represents only a contingent right to the farm and, lacking materiality, is not wealth. A mortgage, like a deed, or bond, or share of stock, or franchise, or railroad ticket, is property, the expression or embodiment of a right to wealth or services. The skill of an artificer, the knowledge of a scholar, the inventive power of a genius, these are not wealth, although they are related to wealth and may be even better and higher than wealth.

The economist judges wealth by its power to satisfy want rather than with reference to its influence on abiding welfare. Alcohol, opium, slaves, come into the purview of economics hand in hand with the most sustaining, elevating, and refining forms of wealth. The economist takes account of enduring satisfaction and immediate gratification only in the same way and to the same degree as do men in general. Wealth and its laws are of primary concern to the student of economics, while welfare is of secondary interest and importance.

The vagueness of the ideas of most persons on the subject of economics, or political economy as it was formerly called, makes it desirable for the student to approach the study with a clear understanding of the nature and scope of the questions with which the subject deals. A mere definition of economics and of wealth, which it treats, may accordingly be supplemented with a bird's-eye view of the modern economic system in order that the central themes of the study may become apparent.

The salient feature of the present economic organization is the ever-increasing interdependence of individual upon individual, of

community upon community. Commodities that satisfy our simplest wants are the product of the cooperative effort of countless individuals, even groups, whose circles extend beyond the limits of our customary thought. Individual is bound to individual, section to section, country to country, by ties of trade and exchange that form a complicated network that extends to the remotest points. The whole is so bound together that, like the spider's web, if anything of importance touches it at any point the entire structure may vibrate with effect. How the simple purchase of, let us say, a \$3 pair of gloves reaches back and extends over the economic system will serve to bring to view the main features of that system, its essential nature, as well as typical questions with which the economist is concerned.

The gloves are not made by the retailer, but are purchased from a wholesaler, who in turn buys them directly or indirectly from the manufacturer. The manufacturer purchases the kid from dealers, who in turn import the product. The importation of skins from South America or Asia Minor involves the use of shipping, in the construction of which perhaps hundreds of trades are included, necessarily. The transportation of the raw materials and finished product requires the services of the railways, whose most recently acquired locomotive represents the joint contribution of the steel, brass, copper, glass, oil, leather, rubber, and other trades, each of which has an indefinitely large number of branches. The building trades with their extensive ramifications are involved in housing the glove cutters and stitchers. The knife makers and sewing-machine manufacturers, the paper makers and box makers are also taken in along with the spinners of the thread and growers of the silk and cotton. Even the cotton broker with his "seat" on the exchange plays a rôle in the roundabout process of glove making.

Power is required at many stages of the manufacturing process, involving the coal trade with all of its subsidiary and supporting industries. The lighting current is the indirect product of great electric works, whose commercial and industrial tentacles reach far in all directions. The credit system functions at many points, as the materials pass from producer to dealer, from dealer to manufacturer, and from manufacturer to jobber, retailer, and consumer. Commercial banks, foreign exchange houses, and investment banking houses—i. e., bond houses—are all essential to the glove manufacture and its related branches of trade and industry.

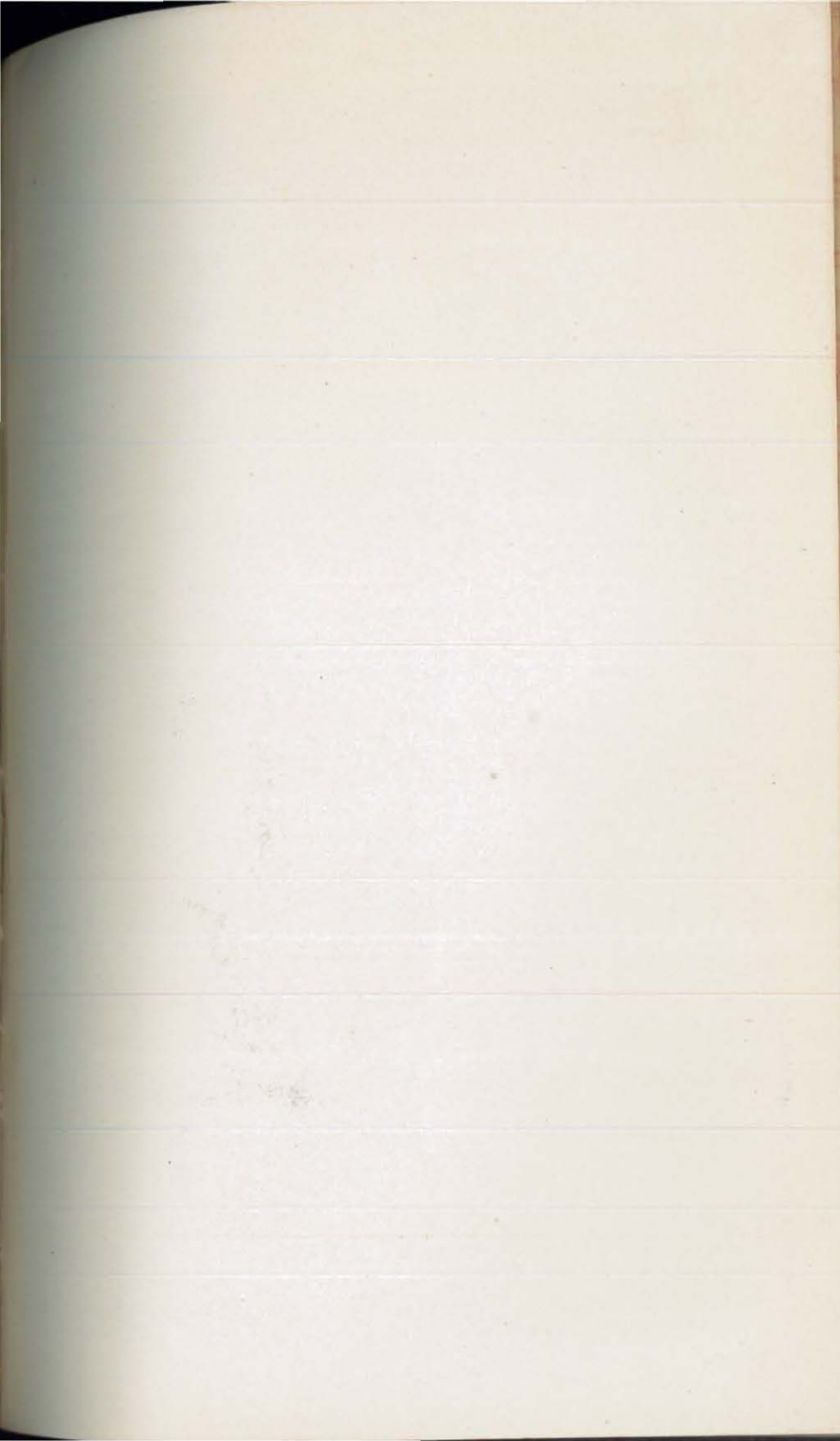
The retail store from which the gloves are purchased constitutes a focal point in a network of economic connections that spread over the continents and across the seas. The retail store is at once the pinnacle and support of an exceedingly complicated economic system—a system that is the subject matter of economics.

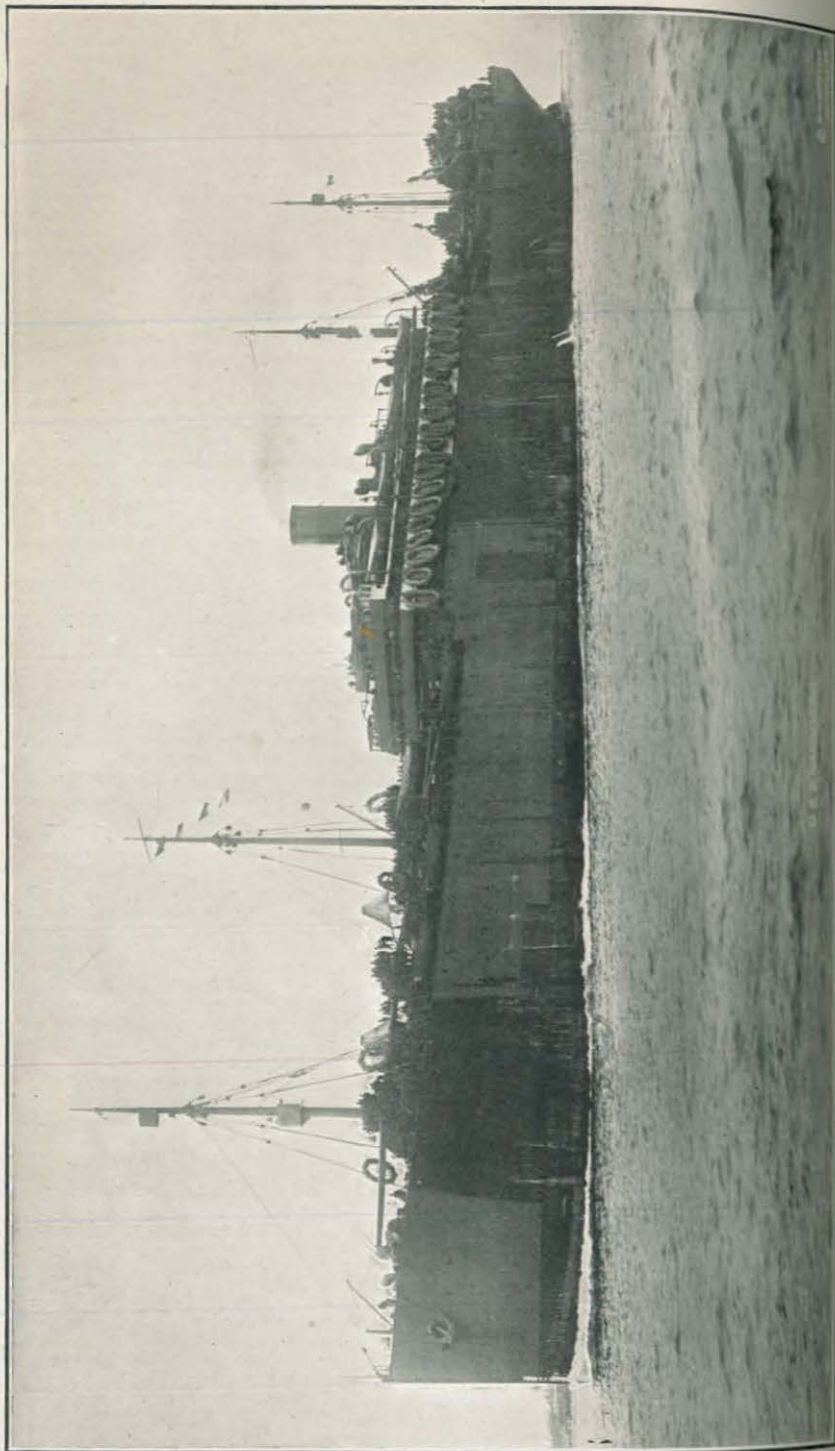
The problems that emerge from the brief analysis just made are among the foremost the economist has to solve. Why was the price of the gloves \$3? What proportion of the price was retained as profit by the retailer and wholesaler? What determined the rates charged by the transportation agencies? What determined the share of the price secured by labor, the investor, the banker, the landowner, the manufacturer? Why is the industry highly localized? Is it of such a nature as readily to become an integral and permanent part of a "trust"? How are imports from South America and Asia Minor financed? What would be the effects of the application of "protection" to the glove industry? What other forms of taxation commend themselves? These are questions of vital import to the wage earner, the stockholder, the bondholder, the landowner, the statesman, and all citizens who are interested in the size of the national income stream, its character, and distribution.

Of the textbooks most adaptable to the needs of the beginning student who is not in frequent touch with a teacher may be mentioned Ely and Wicker's *Elementary Economics*, and Clay's *Economics for the General Reader*, both of which are published by the Macmillan Co., New York. If time is available for the thoughtful reading of only one text, the first mentioned is the more highly recommended. Its style is clear, the treatment simple but not superficial. Questions at the end of each chapter are well designed to enable the student to test the thoroughness of his mastery of the chapter contents. Valuable reading references are given in the same connection.

The book by Clay is an English work and, although revised for the American reader, still has a British flavor—a circumstance that recommends its use along with Ely and Wicker's volume. If the two volumes are studied carefully in parallel fashion, pains being taken to match chapter with chapter and topic with topic, and thorough use made of the numerous questions at the chapter ends of the Ely and Wicker text, the beginner should have little difficulty in acquiring such a mastery of economics as is practicable for the college student in a half year's course of three recitation or lecture hours per week. Should the student desire to pursue the subject further, Taussig's excellent *Principles of Economics*, in two substantial volumes, would serve almost ideally as basic reading.

It is suggested that the student, as soon as he has prepared the material of each successive chapter of the Ely and Wicker text, give himself a written test on one or more questions there contained under the heading "Questions for recitation." A comparison of his written answers with the text itself will serve to correct and amplify the student's views and conceptions. It is also suggested that the student





The U. S. S. "Hanscom," Navy Troop Transport.

read some such economic and business publication as the *Annalist*, published by the New York Times, or the *Economic World*, also a New York publication. Although not essential, the regular reading of a periodical of this nature will illumine and vitalize the subject matter in hand.

In economics, as in other fields of knowledge, there is no short cut to mastery. The road is circuitous, at points rough and steep, nevertheless inviting. The winding ascent affords a widening horizon; the summit, a vista worth while.

THE WORK ON NAVY TRANSPORTS.

By J. W. CARROLL, Pharmacist's Mate (2 c.), United States Navy.

The mere expression "Bringing the boys home" would seem superficially to be a matter of small importance in comparison with matters apparently more closely allied to warfare. But that phrase bears enormous weight when one gives full consideration to its details.

It is with the transportation of human material that we contend. It is the duty of the Medical Department of the Navy to see that this wealth of intricate human mechanism of intelligence is transported across a dangerous ocean in safety and with care.

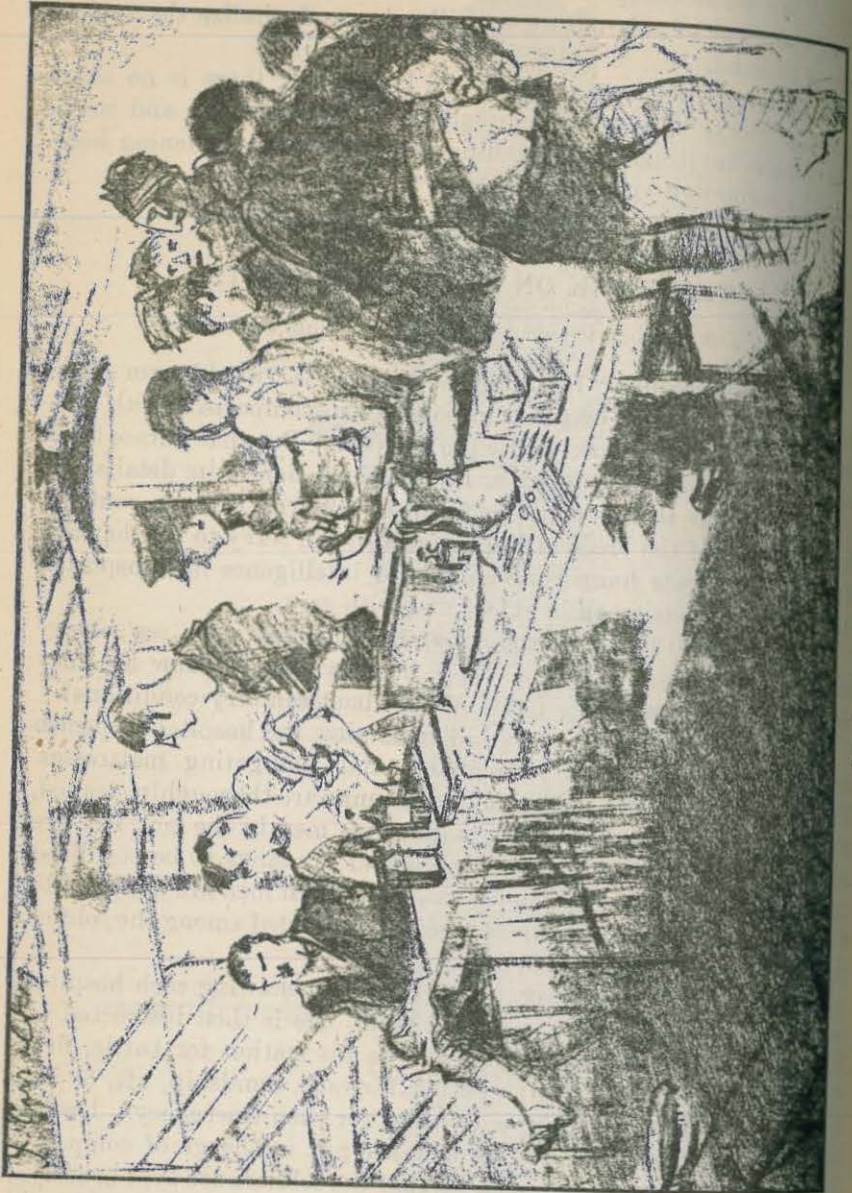
Think of 1,000 to 3,000 troops bundled together on a sea voyage lasting from 10 to 15 days. Where do they sleep? How are they cared for? How are they fed? What about sanitary conditions?

Before the States are hardly hid from view the hospital corpsmen are sterilizing hundreds of blankets and fumigating mattresses. The compartments are painted and the bunks are thoroughly cleaned, painted, and numbered. At the same time men in the sick bay are making hundreds of swabs, bandages, and dressings to be sterilized and ready for use upon reaching France. Then men are assigned to the duty of caring for the expected sick or wounded among the soldier passengers.

At the outset of the voyage a chart is made showing each hospital corpsman's place and duties aboard ship. He is then instructed in his particular duties. Each man knows his station for battle, fire, collision, and abandon ship; whether forward, amidship, aft, or below, and what equipment he is to carry for each emergency. Dressing teams are ready and section men are put in charge of compartments. The men thus in charge see that the soldiers are kept orderly, arrange for their mess, sick call, and conveniences. They report a list of the men for Navy medical record and captain's Log.

Another asset to the system which propagates a spirit of harmony among the hospital corpsmen in connection with their work and duties

is a two-hour session of schooling on each day of the trip to France, conducted by the various medical officers.



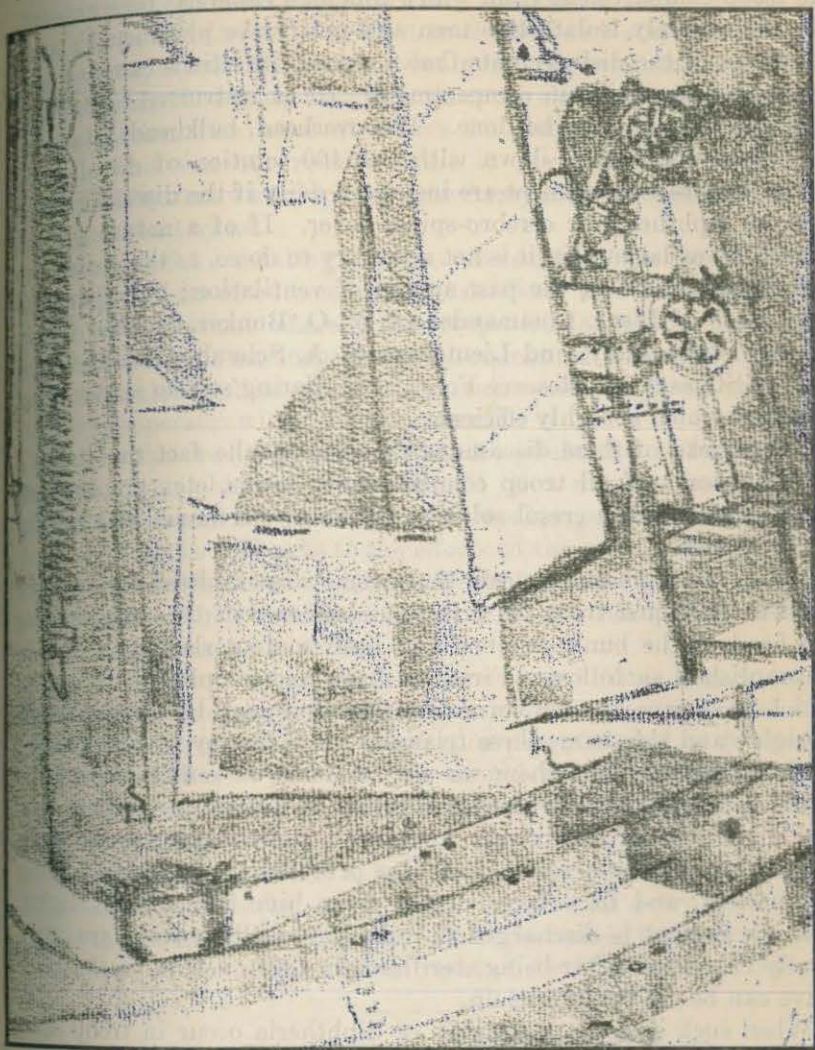
Dressing station on a transport.

Each man knows his particular place of duty and is familiar with it. The return from France, therefore, becomes one of plain sailing and pure routine, of simply "Bringing the boys back again."

TRANSPORT WORK.

By F. O. HUNTSINGER, Chief Pharmacist's Mate, United States Navy.

We must have a clean, healthy ship whenever we arrive in France. Now the problem is to keep it clean under all circumstances and prevent the spread of the various infectious and contagious diseases which



Operating room on a transport.

are prone to develop amongst the troops on our return trip. The medical department of our ship has responded and made preparations to combat these diseases and prevent their spread as much as possible. Various methods are employed and they are most satis-

factory. This is only made possible by the determination and co-operation of everyone in this department.

We must look forward to such diseases as influenza, tonsillitis, bronchitis, pneumonia, cerebro-spinal fever, and other infectious diseases as mumps, scarlet fever, and now and then diphtheria.

When we discover one of these cases, we know that every man in the troop compartment from which this man came has been exposed. We immediately isolate this man and notify the pharmacist's mate in charge of the disinfectants that a certain infectious case has been received from a certain compartment. He is instructed beforehand and knows what is to be done. The overhead, bulkheads, staterooms, and decks are washed down with a 1:400 solution of cresol. The troops in this compartment are inspected daily if the disease was one such as diphtheria or cerebro-spinal fever. If of a nature such as bronchitis or laryngitis, it is not necessary to do so, as those cases are numerous because of the past system of ventilation; but, thanks to the efforts of Lieut. Commander C. W. O. Bunker, Medical Corps, United States Navy, and Lieutenant G. A. Schaub, Medical Corps, United States Naval Reserve Force, a ventilating system is now being installed which is highly efficient.

The spread of these diseases is retarded by the fact that twice a day the decks of all troop compartments, heads, etc., are swabbed down with a 1-400 cresol solution by Army personnel detailed for that purpose.

It has always been our rule that every case admitted to the ward must be protected from the infectious influence of others by having the head of the bunk screened and head to foot sleeping. This is accomplished as follows: First, we have had supplied us triangles which have tape at each corner, so that they may be secured to the uprights and side bars; these triangles are 2 feet by 1½ feet and are made of muslin. Of these we use two, one on either side of the patient's head, and connecting the two is a towel or pillow slip. The advantage of this is that whenever a patient coughs or sneezes the muslin acts as a screen and also prevents any draught hitting the patient, and to a large degree frees him from bright lights. When a patient is discharged to duty the muslin screens are practically clean, and after being sterilized for half an hour in the autoclave can be used safely again.

When such cases as meningitis or diphtheria occur in troop compartments we immediately send atomizers and an antiseptic solution to the compartment, with instructions to the medical unit (Army) that every man in that compartment shall have his nose and throat sprayed three times a day and temperature taken. The man with a temperature is immediately isolated. We have then to deal

with this case and again to combat the fresh appearance of the disease among the troops.

To further combat the disease the senior medical officer has directed that men working in the isolation ward shall not communicate with the main ward, and this has enabled us to prevent the spread of these diseases to our main ward.

During the influenza epidemic every member of the crew who had been ashore was directed to report to the sick bay and have his nose and throat sprayed. Those who remained aboard were mustered twice a day and marched to the sick bay, where an electric sprayer was used in conjunction with hand atomizers for the spraying of nose and throat. This was our routine while in port. When troops came aboard this system was adopted by the Army medical staff with equipment furnished by us.

The successful combating of these diseases has been due largely to the superb efforts of our senior medical officer, who has established a system of inspections whereby the troops, heads, galleys, bathrooms, and compartments are inspected and commented upon daily. Along with the senior medical officer is the senior Army surgeon, who most heartily cooperates with this department.

I believe that we have a most efficient hospital corps, so far as the experience of our older men is concerned. New men are instructed on our trip across and shown the practical work, especially those directly from the schools. Thanks to the efforts of the senior medical officer, there have been formed two classes for daily instruction in the different subjects of their ratings, and only men who can qualify are considered and advanced in rating.

Due to the fact that we transport wounded from France to the United States and to the large number of men who are treated with minor ailments, only efficient hospital corpsmen should be detailed to duty on transports. Incompetents should be weeded out each trip and transferred either to naval hospitals or training schools for further instruction.

The transport service is a branch in which the efficiency of the Hospital Corps must be shown, and I believe that every member attached thereto has since our great work began upheld the high standard of efficiency of the Medical Department of the United States Navy.

THE MEDICAL DEPARTMENT OF THE U. S. S. "SUSQUEHANNA."

By W. L. MARTIN, Lieutenant, Medical Corps, United States Navy.

The medical department of transports did not at first attract the attention that was accorded to other departments. This was due in the first place to the fact that the submarine menace necessitated

good guns' crews, numerous lookouts on the alert at all times, and firemen ready to work to their utmost to furnish steam to drive the ship out of danger; and, secondly, to the fact that no one knew just how much work would fall to this department as transport duty on a large scale was a new departure for the Navy. However, the carrying of large numbers of men in such close quarters and for the long time required for passage, made necessary the development of transport sanitation to a high degree of efficiency, and as a great many cases of acute disease developed as a result of crowding, the medical department was forced to work to the limit on each voyage to care for them. The response of the enlisted men in this department was wonderful. It was necessary for them to work long hours in constant danger not only of being torpedoed but also of contracting disease from the patients they were nursing, and as they had only the blue lights to work by at night and as the ship pitched and rolled in even a moderate sea, they were working under new conditions which were decidedly unfavorable. But they were not discouraged, they did not complain or shirk, but on the contrary they performed their duties in a manner that reflected very favorably upon the efficiency of the Navy, particularly upon the efficiency of the organization of the Department of Medicine and Surgery. These boys were not lauded by the press; they were not up on the decks manning the guns, they were usually out of general view going quietly about their work, often isolated with contagious cases, and the way they did their bit is best learned by asking one of the thousands of sick soldiers whom they cared for what they think of the Navy hospital corpsman. The average medical department personnel of this ship consists of 3 medical officers, 1 pharmacist, and 18 hospital corpsmen. Various incidents in which the medical department played important parts are described in succeeding paragraphs.

THE FIRE.

On the morning of December 2, 1917, while the U. S. S. *Susquehanna* was on her course in a rough sea with a fire wind blowing, a smoke-screen apparatus containing phosphorus, stowed on the starboard side of the after wheelhouse, ignited. A fire alarm was sounded and all hands were called to quarters.

The medical officers and hospital corpsmen reported to the sick bay to await orders. A first-aid party was dispatched to the scene of the fire and other men detailed where needed. The various details were carried out very successfully, considering the fact that only a few members of the crew were ever at sea before and thus far had been instructed on one occasion only as to their duties in case of such an accident.

The sick bay, being located directly under the scene of the fire, was immediately filled with smoke and, not realizing the extent of the fire, the patients immediately evacuated themselves to the passageway leading to the sick bay. They were later given blankets and quartered in a more comfortable place.

In the meantime other hospital corpsmen were ordered to remove all inflammables to a place where they could easily be thrown overboard. The medical journal, health records, and all other papers considered of special value were carried to a place of safety.

At 4 o'clock "secure" had been sounded and patients were returned to the sick bay. All the materials removed during the fire were restowed.

THE AMMONIA-GAS EXPLOSION.

At 4 o'clock on the morning of January 1, 1918, an ammonia tank was accidentally punctured. The gas filled the troop compartments in hatch No. 2 and the crew's quarters under the forecastle with remarkable rapidity.

All medical officers and hospital corpsmen were called to their stations and a first-aid party, with necessary equipment, under the medical officer of the day, was dispatched to the place of the accident.

The sick bay was made ready to receive those injured or overcome by the gas. Cases were transferred to the sick bay in splint stretchers which had previously been stowed in a near-by compartment to provide for such accidents. The first case received was in an unconscious state, suffering from asphyxia. Artificial respiration and other measures were resorted to without avail. From time to time other cases were received and treated. Ambulances were alongside within 20 minutes after the explosion and transported all Army cases to a near-by base hospital. A total of 129 cases, some of whom were in a serious condition, were cared for, with the loss of but one man at the time. Another succumbed from its effects at a later date.

THE INFLUENZA EPIDEMIC.

During a part of the month of September, 1918, the ship was moored to the dock at Norfolk, Va. An influenza epidemic was in evidence, so the crew was immediately restricted to the ship. Plans were devised by the medical officer by which the disease might be retarded in its rapid spread. A prophylactic treatment consisting of colloidal silver, 10 per cent in the eyes and nose twice each day, proved very successful in every way, as the cases developing in the crew diminished rapidly.

The condition of the crew was very satisfactory when a contingent of troops was brought on board for transportation to France. These men had been quartered in a camp where influenza was prevalent,

and, as a matter of fact, some were at the time of their arrival in the advanced stages of pneumonia and one man was delirious. Within a short time after their arrival about 40 cases were admitted to the sick bay.

The medical officer, realizing the danger of embarking on a two weeks' voyage with an epidemic aboard, sent a letter to the commanding officer recommending that the ship not put to sea; but the ship did sail after transferring those who were already sick.

The cases continued to develop with such rapidity that very soon the sick bay would no longer accommodate them, so a troop compartment was converted into a sick bay annex. This place was very inadequate, as the patients were so crowded, due to the close proximity of the bunks, that it was very uncomfortable for them.

During the two weeks a total of 213 cases were cared for, with the loss of but 4 cases.

The senior medical officer worked alone during the entire trip, the junior medical officers being sick at the time. This event won for him the complete confidence of every member of the crew, and all appreciated his efforts in making a good record for the ship. He was assisted by a pharmacist and 18 hospital corpsmen.

A letter commending the work of the medical officer and hospital corpsmen was forwarded to the department by the colonel commanding the troops on board. The boarding officer in France complimented the medical officer on the excellent condition of the patients transferred, saying, in substance, that they were in better condition than any thus far received.

TRANSPORTATION OF SICK AND WOUNDED TO THE UNITED STATES.

Before the armistice was signed about 100 hundred Army patients were returned to the States each return voyage. This was all that could be evacuated quickly and safely in case of accident to the ship. After the submarines were no longer a menace the sick and wounded were sent back in larger numbers, about 650 patients being carried each voyage. This increased the work of this department very much and the Hospital Corps complement was increased to 40. A greater number of patients than is cared for by most large civilian hospitals was now carried each voyage, and it required new organization and close cooperation with Army embarkation and debarkation officials.

After the number and kind of patients to be accommodated by the ship is determined by the medical aid at the French port and the medical officer of the ship, the medical aid notifies the authorities of the base hospital at Savenay, and at an appointed time they are transported to the port in hospital trains.

The success of the system of loading is due to a plan drafted and executed by the medical aid at St. Nazaire, France, which is perfect in every detail. Each patient has a tag attached to the front of his blouse, the color of which indicates the class to which he belongs, thus enabling us at a mere glance to direct him to the ward in which he will be cared for during voyage to the United States. His name, rank, organization, and diagnosis is typewritten on this card, by which the Army embarkation officials check him on board.

Hot coffee and sandwiches are served immediately. Medical officers hold sick call in their wards and the dressing teams begin operations.

Once underway the task of delousing is begun, and all patients having "cooties" are deloused and issued clean underclothing while all their belongings are being sterilized. All patients are given shower baths and new underclothing issued to them.

The representatives of the welfare societies move from ward to ward during the day showing moving pictures, and from time to time issue cigarettes, candies, jams, and fruit, all of which is very much appreciated by the returning soldier man. Underwear, socks, sweaters, comfort kits, candies, pipes, tobacco, cigarettes, toilet articles, etc., are supplied in unlimited quantity by the American Red Cross for issue through the medical officer to the returning sick and wounded.

Articles of special diet and fruits are obtained from the supply officer. In addition musicians play for the sick, and this, coupled with the victrolas in each ward, furnishes a plentiful supply of music and serves to make the soldier the happy-go-lucky fellow that he is and is a fair introduction to the fine time he is to have upon his arrival in the United States.

Forty-eight hours before arrival in port of debarkation authorities have been informed by radio of the number and class of patients carried. At a specially constructed dock for the purpose of unloading patients, the ambulances are waiting, some manned by Army men and some by the motor corps girls, ready to transfer the sick and wounded to the embarkation hospital. As fast as the patients can pass over the gangways they are checked on the passenger lists by representatives of both the Army and Navy. This is accomplished very quickly, as a crier shouts number and name of the patient obtained from a tag hanging from the front of his blouse.

When the work of the Navy in the big war is told the medical departments of the Navy transports must be given credit for the most important medical work done by the Navy. They were not only seeing the hardest kind of sea duty but were also doing as much work as many hospitals on shore.

ORGANIZATION OF MEDICAL DEPARTMENT FOR TRANSPORTATION OF SICK AND WOUNDED FROM FRANCE TO THE UNITED STATES.

The transportation of sick and wounded from France has increased the work of the medical department of transports to such an extent that new organizations have had to be worked out. The outlines of a new organization of the medical department of this ship were worked out when the sick and wounded were being sent back in small numbers, so that when many hundreds were sent back each trip it was only necessary to secure more space in troop compartments for berthing them, as the organization could expand on very short notice, and efficiently care for 1,000 patients. It was decided, however, that about 650 sick and wounded could be carried under the best conditions, in addition to the passengers carried.

Compartments Assigned for Carrying Patients.

To accommodate these patients all troop compartments in the after half of the ship were turned over to the medical department, furnishing five berthing and two messing compartments. From 25 to 40 stretcher cases were carried in sick-bay bunks. Thus we had an ideal division of troop carrying space, the entire after half of the troop carrying space being assigned to patients while the forward half was filled with Army and Navy passengers. The two messing compartments aft furnished ample room for messing the patients and in the intervals between messing times are used for recreation spaces.

Details of Medical Department Personnel.

The assignment of medical department personnel is best shown by the accompanying diagram, Exhibit A. Junior medical officers are detailed as follows: One to take care of patients in the sick bay and to have charge of dressing team No. 1; one to have charge of dressing team No. 2 for troop compartments and to care for the ambulatory surgical cases in compartment D-503; the remaining two medical officers are assigned to dressing team No. 2 and to compartments D-401, D-402, D-403, and D-404, respectively. Hospital corpsmen are instructed in their duties and stations by the pharmacist during the trip to France so that when patients come on board they are waiting at their stations to receive them. A watch, quarter, and station bill posted on the bulletin board in the sick bay, which shows each hospital corpsman his detail and station at drills and clearly defines his duties in the medical department, is a means of ready reference and supplements the instruction given during the east-bound voyage. The pharmacist is in charge of Hospital Corps detail, and has assigned one chief pharmacist's mate in charge of stores and the dispensary, one chief pharmacist's mate in charge of all clerical work, one chief pharmacist's mate in charge of sick bay ward and the dressing teams, and one pharmacist's mate first class in charge of patients in compartments. These men were all trained and rated on board, are experienced in the transport service, and are invaluable in their present details, which are the ones in which they have shown the most aptitude. Two pharmacist's mates are in charge of the patients, messing with a detail of seamen for cleaning. Two hospital corpsmen are assigned to each troop compartment used for patients. One of these men is on duty at all times, and they sleep in the compartment, but are separated from the patients. These men assist the medical officer in charge of the compartment at sick call, administer treatments, are on the lookout for vermin at all times, and superintend the

cleaning by a detail of seamen. They see that the patients are clean and comfortable, that they are shaved and have their hair trimmed, and that men who are crippled are assisted when moving about. Two hospital corpsmen are on night watch at all times; one man in the sick bay and one man who makes rounds through all compartments occupied by patients every half hour. There are two surgical dressing teams, each team in charge of a pharmacist's mate first class. One team works with the medical officer in charge of the sick-bay patients, while the other team works with the medical officers assigned to the dressing station in troop compartments. These teams prepare and sterilize dressings and bandages throughout the east-bound voyage. At general quarters and drill the medical department personnel is concentrated with the patients so that in case of actual abandon ship the patients could be evacuated quickly. During the period of active submarine menace, stretcher carriers were detailed from other divisions to assist in evacuating patients. Two small dressing stations are provided for in other parts of the ship. Copies of orders to medical officers are appended: Stations at drills, Exhibit B; duties of officer of the day, Exhibit C; and also orders to Army and Navy hospital corpsmen, Exhibit D; and orders to cleaning detail, Exhibit E.

Embarkation of Patients.

The number and types of cases to be received is decided after inspection of available compartments by the medical aid at a French port and a consultation with the medical officer of the ship as to the number he is prepared to care for. As soon as the number and type of cases has been decided upon the medical officer plans their distribution in the various compartments so that before the patients come on board it has been decided just what cases and how many will be carried in each compartment. All confusion is eliminated in embarking patients at St. Nazaire due to the system of tagging and checking them used by Commander R. G. Heiner, Medical Corps, United States Navy, who is medical aid there. The patients are checked by name and number as they pass over the gangway, and the color of the tag they are wearing indicates the type of case so that all that is necessary is to give him a billet slip which tells him the number of his compartment, of his bunk, of his mess compartment, and of his abandon-ship station which was assigned to him as soon as the number and type of cases was ascertained.

The type of case is indicated as follows:

1. Blue tag—Stretcher case in sick bay.
2. White tag—Requiring dressings in standees.
3. Green tag—Requiring no dressing (Help, No. A. No help, No. B).
4. Yellow tag—Tuberculosis.
5. Red tag—Mental.

The billet slips are those used for all troops, Exhibit F, Hospital Corps men are standing by to escort the patients to their compartments and the messing details have coffee and sandwiches ready to serve.

Care of Patients.

All surgical dressing cases are redressed as soon as they have been made comfortable in their new surroundings and as necessary after the first redressing. Medical cases are examined and proper treatment prescribed. Sick call is held twice daily in each compartment at 8.15 a. m. and 6 p. m. Redressings are done daily at 9 a. m. Messing of patients is supervised by a pharmacist mate and

is from the regular troops' mess prepared by the supply department. The quality and quantity of the food has been very satisfactory, and has been accorded unstinted praise by the patients. Efforts are made to have it as appetizing as possible. Crippled patients are served at mess tables in advance of others. The troughs for washing mess gear are kept filled with clean water at the boiling point and are sterilized by live steam after each meal. The services of the ship's barbers are secured when necessary during the trip, and efforts are made to improve the patients in appearance. There is a moving picture show daily in one of the mess compartments, Victrolas have been secured both for the sick bay and for the compartments, and books and magazines are distributed frequently. Articles such as toothbrushes, tooth paste, towels, toilet soap, safety razors, shaving soap, candy, tobacco, cigarettes, playing cards, games, etc., furnished by the Red Cross contribute in great measure to the care, comfort, and contentment of the sick and wounded transported on board this ship. During an earlier trip it was noticed that canes would be a great help to crippled patients. This was mentioned to the Red Cross representative and now several dozen stout canes are carried each trip.

Clerical Work.

The hospital corpsmen assigned to each compartment muster their patients as soon as possible after embarkation, and fill out the accompanying slip marked "Exhibit G," which gives the man's name, color, rate, organization, number, place, and date of enlistment and of birth, name, relation, and address of next of kin. These slips are then turned in to the office force where they are filed in alphabetical order by compartments. All papers and records accompanying patient are turned over to the office force who immediately begin sorting and verifying them and then file them to correspond to the slips sent up from the compartments. The diagnoses are verified by medical officers and then the required forms and report can be readily made up. An alphabetical list is made of all patients by compartments, and a number assigned to each man in sequence beginning with No. 1. Tags similar to the accompanying form, Exhibit H, are made out in duplicate for each patient, stating name, number, rank, organization, date of admission, diagnosis, and abandon-ship station. The day before debarking one tag is attached to the front of each patient's blouse and the other to his barracks bag. Patients confined to their bunks are tagged immediately after admission, so that in case of actual abandon ship stretcher bearers could tell at a glance to what boat he belongs in case the patient should not remember his abandon-ship station.

Debarkation of Patients in the United States.

When the Army medical officers on the pier state that they are ready to receive patients the ambulatory cases are lined up in their compartments according to their numbers and then pass over the gangway, where they are checked both by number and by name. One corpsman calls out the patient's name and number from the tag attached to his blouse and he is immediately checked off by Army and Navy representatives on duplicate lists. With this system of tagging and with patients lined up to correspond to the lists, patients can be debarked as rapidly as they can pass over the gangway. Stretcher cases and contagious cases are taken off last. Here the debarkation is slower, due to the care exercised in moving stretcher cases, but the checking is just as rapid, and each patient is not kept waiting several minutes while Army and Navy representatives search for his name through a jumbled-up list of patients. As soon as the

patient's number is called the checkers know immediately where to look for the name, and as quickly as name and number can be called they are checked off. At the same time their baggage, plainly marked by tags, is being unloaded by stevedores. All papers and records arranged in order according to the lists are then turned over to the Army medical officer and debarkation is completed.

THE CARGO CARRIER, N. O. T. S.

The United States Navy manned and operated during the war many cargo vessels. On board these vessels it was not practicable to place a commissioned medical officer (doctor) because of the large number of such vessels and the necessity for the utilization of doctors on board ships of larger personnel. Most of these cargo vessels carried a Navy crew of about 100 persons or less. Separated many days from port, the men who became sick and injured on board received first-aid care from a Navy hospital corpsman especially selected and trained for this important medical duty. How well the hospital corpsmen assigned to this independent duty performed their work is evident when it is realized that approximately 30,000 men on vessels of this type went through the influenza epidemic while the individual vessels were in European ports, in ports of the United States, or on the high seas, and not a complaint has been heard that a single man of the thousands taken ill was in any way neglected or that the first-aid care given during this epidemic was insufficient in any way. This test of the Hospital Corps personnel on board these vessels has proved the efficiency of Hospital Corps training and the Medical Department of the Navy is proud of the ability shown by these men.

Cargo carriers are large factors in the supply of food, clothing, munitions, ordnance, etc., to the Navy and to the Army in Europe. Some few of these vessels went to more distant ports on special missions. In the January 1, 1919, number of the SUPPLEMENT certain instructions given hospital corpsmen on board N. O. T. S. vessels by Commander Bachmann, the senior medical officer, N. O. T. S., New York, appeared on the following subjects: "Ship hygiene," "Purification of water," "Typhoid prophylaxis," "Battle stations," "Death on board N. O. T. S. ships."

In the present number there appears an interesting abstract from Dr. Bachmann's Annual Sanitary Report.

How the Secretary of the Navy feels about these vessels may be seen in his statement made in his Annual Sanitary Report, 1918 (p. 20):

I would be derelict in my duty unless I expressed my keenest appreciation and heartiest admiration for those men of the Naval Overseas Transportation Service who have traveled the lonely lanes of the ocean, which have been for

so long infested with the menacing submarine. They have braved the dangers most willingly and have thereby exemplified the best traditions of the Navy of the United States. In the many engagements with the enemy submarines our fleet has necessarily suffered, but it is believed that the losses of the enemy have been relatively greater than ours. (G. F. C.)

THE CARGO CARRIER, N. O. T. S.¹

By R. A. BACHMANN, Commander, Medical Corps, United States Navy, Medical Aids,
N. O. T. S.

The official establishment of the Naval Overseas Transportation Service, or N. O. T. S., took place January 9, 1918, when the Office of Naval Operations assigned a fleet of 72 vessels to the N. O. T. S. for operation. These vessels were ships which previously belonged to the merchant marine, but were now taken over in order to expedite the transportation of supplies to our Army in France and other places. The personnel was changed so that civilian officers and crews were taken off and reserve officers and a mixture of reserve and regular enlisted men took their places. These ships ranged as a rule from 3,000 to 10,000 tons burden and carried a total complement of from 75 to 175 officers and men.

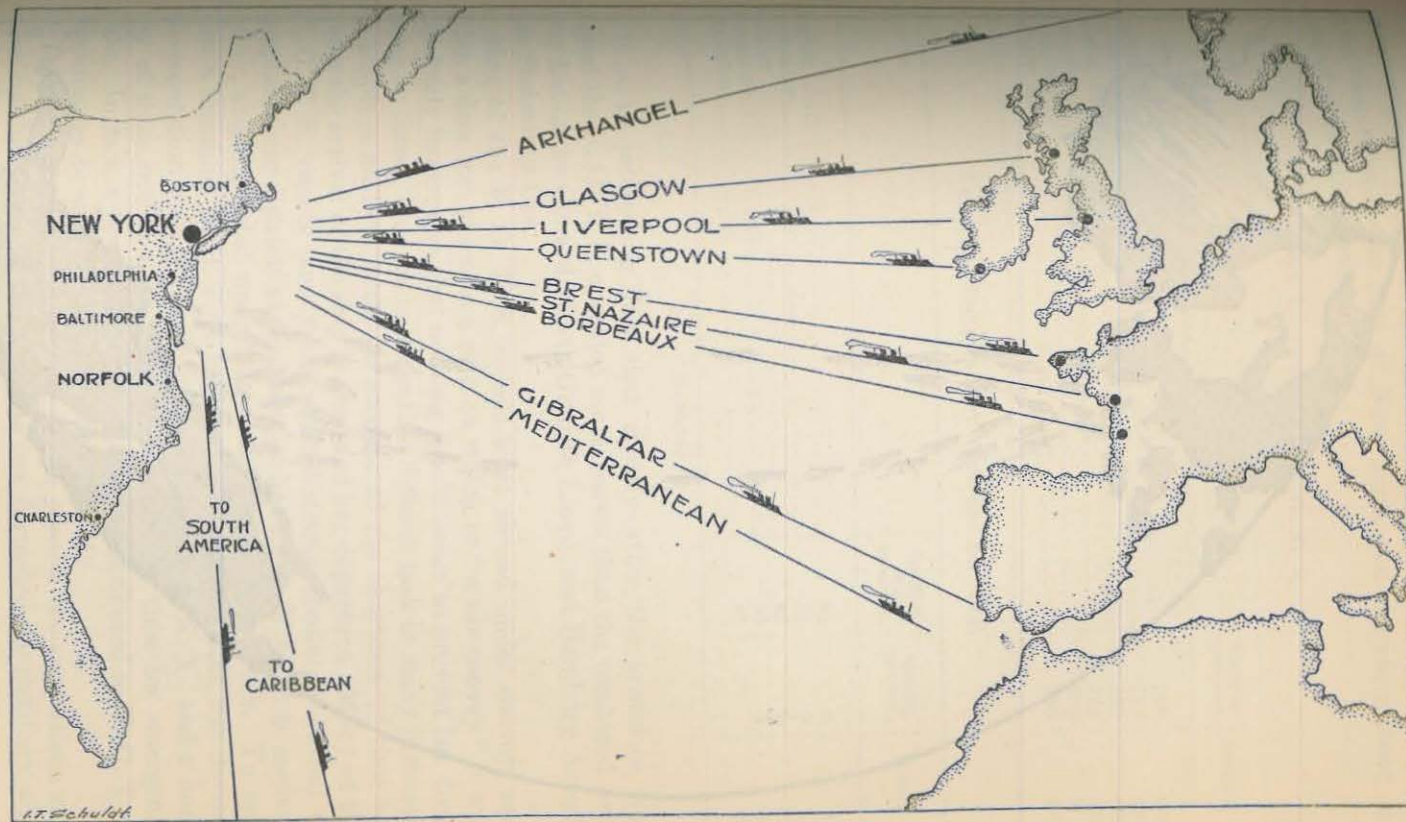
By August, 1918, the N. O. T. S. fleet had reached a growth of 180 ships, of which 80 per cent sailed from the third naval district; thus the port of New York became on account of its activity the virtual center of the N. O. T. S.

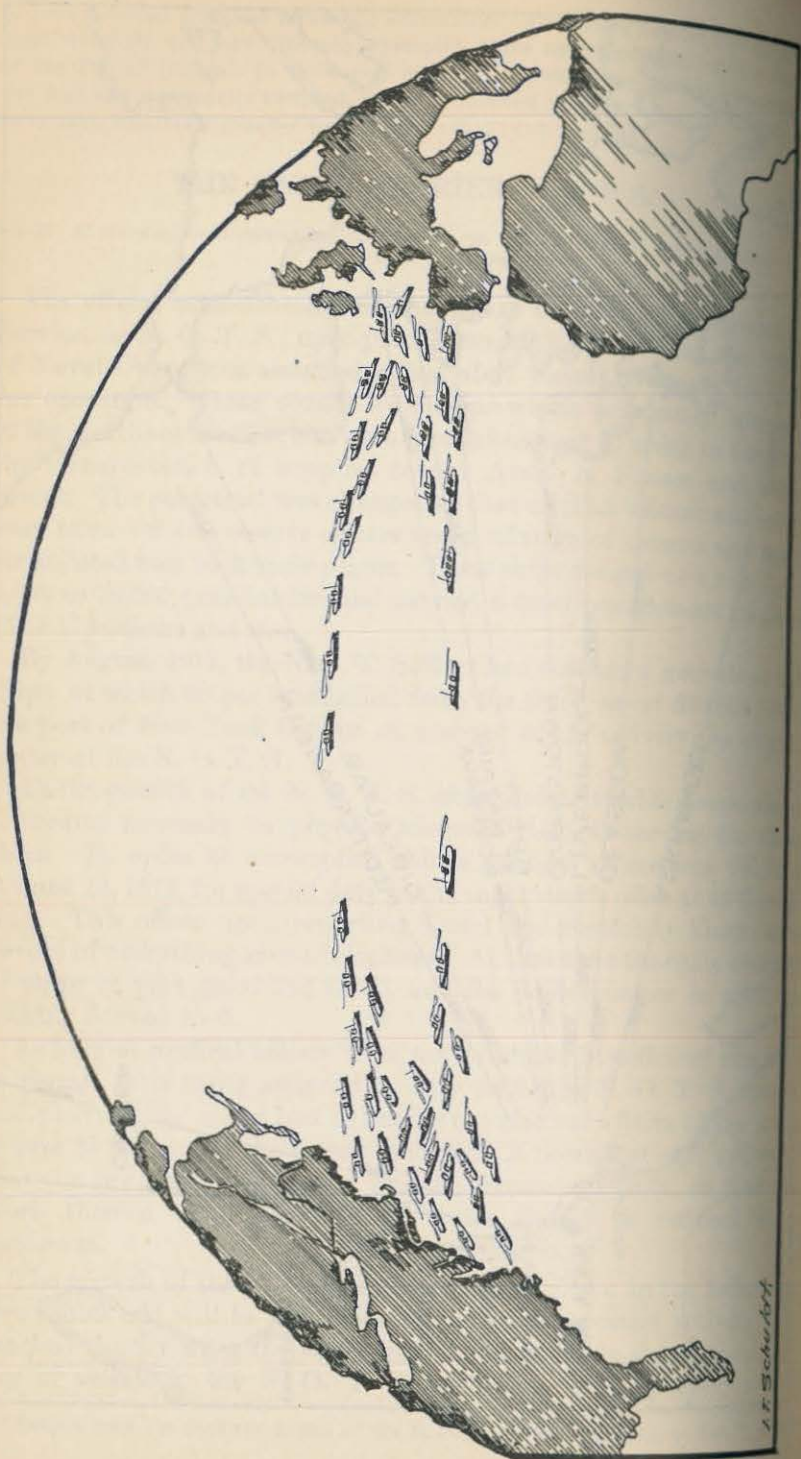
As the growth of the N. O. T. S. expanded to sizable proportions, it became necessary to provide adequate medical service for these ships. In order to accomplish this a medical officer was detailed August 16, 1918, for special duty in the supervisor's office at 45 Broadway. This officer upon reporting found one absolutely blank office devoid of everything save a telephone. At that time the daily average of ships in port amounted to 35, and the daily number in addition making convoy to 6.

As long as medical officers were not available in sufficient numbers to permit their being assigned to duty on board N. O. T. S. vessels and pharmacists' mates had to handle the medical affairs of the ships in over 85 per cent of the vessels concerned, it became at once apparent that the prevention of disease was the paramount duty, so that the work thrown upon pharmacists' mates should be reduced to a minimum.

The growth of the N. O. T. S. in vessels is shown in the following two tables. It will be seen that the period of greatest activity was reached shortly after the armistice. The first table shows the number of vessels in the N. O. T. S., including those in every naval

¹ Extract from the Sanitary Report of the N. O. T. S., Aug. 16, 1918, to Jan. 1, 1919.





district. The second table shows the number of vessels which at any given time were in the port of New York, and therefore stood in need of medical supervision.

TABLE 1.—*Growth of N. O. T. S.*

| | Ships in operation. | Assigned. |
|----------------------|---------------------|-----------|
| August, 1918..... | 180 | 285 |
| September, 1918..... | 245 | 388 |
| October, 1918..... | 280 | 405 |
| November, 1918..... | 342 | 452 |
| December, 1918..... | 375 | 512 |
| January, 1919..... | 380 | 477 |

TABLE 2.—*Ships in port (average per day).*

| | Loading and repairing. | Making convoy. | Total. |
|----------------|------------------------|------------------|--------|
| August..... | 35 | 6 | 41 |
| September..... | 36 | 5 | 41 |
| October..... | 46 | 6 | 51 |
| November..... | 50 | 5 | 55 |
| December..... | 67 | (¹) | 67 |

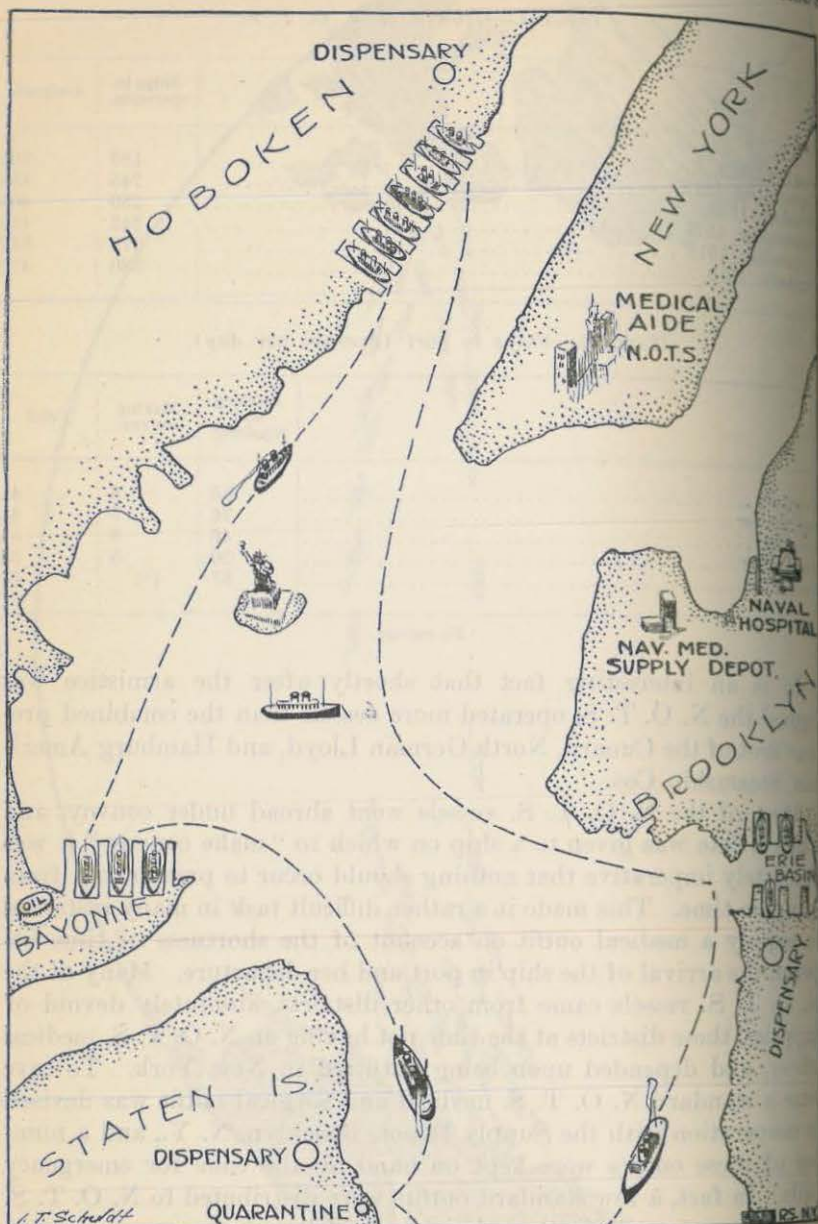
¹ No convoy.

It is an interesting fact that shortly after the armistice was signed the N. O. T. S. operated more vessels than the combined pre-war fleet of the Cunard, North German Lloyd, and Hamburg American Steamship Cos.

Most of the N. O. T. S. vessels went abroad under convoy, and when a date was given to a ship on which to "make convoy" it was absolutely imperative that nothing should occur to prevent her from being on time. This made it a rather difficult task in many instances to supply a medical outfit on account of the shortness of time between the arrival of the ship in port and her departure. Many of the N. O. T. S. vessels came from other districts, absolutely devoid of supplies, these districts at the time not having an N. O. T. S. medical officer, and depended upon being outfitted in New York. To save time a standard N. O. T. S. medical and surgical outfit was devised in cooperation with the Supply Depot, Brooklyn, N. Y., and a number of these outfits were kept on hand all the time for emergency calls. In fact, a few standard outfits were distributed to N. O. T. S. dispensaries to still further obviate any delay.

The outfit, on the whole, followed in general the suggestions supplied by the bureau in the medicine box furnished the auxiliary serv-

ice, etc. N. O. T. S. vessels, as a rule, required a more ample outfit on account of their unusual and oftentimes hazardous duty. The needs of N. O. T. S. vessels were carefully studied, and each pharmacist's



mate was questioned closely regarding the difficulties he had experienced on his trips. Whenever it was found possible to supply a drug or surgical appliance that might prove of assistance, this item was

included in the regular standard N. O. T. S. outfit, and thus in a short while this collection of medicines, dressings, and surgical appliances was as complete as limited space permitted it to be, and it is a noteworthy fact that after the standard outfit was finally made up in its present form this office had no further complaints from any vessel that the supplies furnished proved too little in variety or kind. In no instance did any ship leave the port of New York without a standard outfit on board, although on several occasions but a few hours were allotted to do this.

Upon the return of an N. O. T. S. vessel to New York the pharmacist's mate received instructions to make out an inventory of supplies on hand and submit it, together with a replenishment requisition. These requisitions were completed by either the supply depot or one of the N. O. T. S. dispensaries, depending upon the size of the requisitions and the amount of time given to fill them.

Among other things, it was found necessary to supply antityphoid and cowpox vaccines and antidiphtheritic and antitetanus sera.

Many of the pharmacists' mates suffered for lack of proper books to assist them in their work. To remedy this the Bureau of Medicine and Surgery supplied five small volumes: Clinical Studies for Nurses, the Treatment of Emergencies, Pocket Medical Cyclopedic, a small medical dictionary, and Treatment of Venereal Diseases, in addition to the Handy Book for the Hospital Corps, and the Manual of the Medical Department. These books were selected so that anyone skilled in nursing but without comprehensive medical knowledge could take care of any of the graver diseases in a most efficient manner, and they proved of great assistance. At the bureau's suggestion, also, an embalming outfit was placed aboard most of the N. O. T. S. vessels coming into New York, together with instructions for the use of the same prepared at this office. Up to date no information has been received as to the practical working of this outfit.

By special arrangement with the local public health service this office was permitted to issue bills of health to outgoing vessels.

It was found that frequently N. O. T. S. vessels took water aboard at a foreign port. Many times this water was not of the best quality, and small outbreaks of intestinal disturbance occurred among the crew. To neutralize this source of danger a water sterilization outfit was prepared which consisted of three large and six small tubes of calcium hypochlorite graduated in weight so that any amount of water from 100 to 2,000 gallons could be sterilized.

The type of hospital corpsman supplied by the Bureau of Medicine and Surgery to N. O. T. S. vessels was of the highest. As a rule, they were regular service men of long experience, medical students, or men who had pharmaceutical experience. These men proved to be

dependable and equal in every way to the work expected of them. Many difficulties and vexing questions arose in the performance of their duty, and it became the work of this office to straighten out complexities and furnish guidance.

The Medical Aid's Office at 45 Broadway soon became the headquarters for pharmacists' mates whenever they were in doubt as to the proper method to pursue, and thus by studying the nature of the difficulties most frequently presented sets of instructions were drawn up from time to time and circulated to all N. O. T. S. vessels. These instructions covered many subjects from clerical procedures to methods of sanitation and are herewith submitted.

INSTRUCTIONS FOR PHARMACIST'S MATES ACTING INDEPENDENTLY ON N. O. T. S. VESSELS.

1. Upon arrival at New York report to medical aid, N. O. T. S., room 900, 45 Broadway, for any information or instruction desired. Telephone, Rector 9200.

2. When in the harbor of New York three dispensaries are available for N. O. T. S. vessels. Locate the one nearest your ship and go to this one for all medical assistance.

(a) A medical officer from the dispensary at Steven's Institute, Hoboken, N. J., will answer all emergency calls day or night. Telephone, Hoboken 2865.

(b) A medical officer from the dispensary at Bush Terminal will answer all calls day or night. Telephone, Sunset 7500, extension 134.

(c) A medical officer from the dispensary at Rosebank, Staten Island, will answer all calls day or night and will also attend to fumigation of all N. O. T. S. vessels. Telephone, Tompkinsville 2722, extension 4.

3. N. O. T. S. vessels will be supplied with a full set of Medical Department forms, but only the following should be made out:

Form F: Rough abstract of patients. (When a patient is admitted.)

Form F: Smooth abstract of patients. (Monthly.)

Form K: Statistical report. Make this out in quadruplicate, so that medical aid, N. O. T. S., may retain a copy. (Monthly.)

Form H: Health record—(green) officers; loose sheets (gray) enlisted men. (When a patient is admitted.)

Form O: Request for standard forms. (When needed.)

Form G: Hospital ticket. (When a patient is sent to hospital.)

Form Q: Clinical chart. (For all serious cases.)

Form N: Death report. (Whenever a death occurs.)

Form 4: Requisition for supplies. (When supplies are needed.)

Morning report of sick. (Daily to commanding officer.)

Binnacle list. (Daily to officer of deck.)

Journal of Medical Department. (See par. 11.)

All forms when made out should be sent to the medical aid, N. O. T. S.

4. A complete medical and surgical outfit will be put aboard each vessel when commissioned or later. This outfit contains all the medical and surgical supplies which experience has demonstrated necessary for the vessels of the N. O. T. S. class. The pharmacists' mates on these ships may note that certain drugs are not on the list, but in such a case they will also see that a substitute is always provided. For instance, instead of using elixir heroin for a cough

mixture, brown mixture is provided; or, instead of using cocaine for a local anesthetic, procaine may be employed. When, after a trip, medical supplies become exhausted, be sure that a full allowance is made up before leaving port. For this purpose make out a list of supplies needed on Form 4 and submit the same to the medical aid, N. O. T. S. Do not go to any of the dispensaries or the supply depot at Brooklyn for supplies. The amounts of articles asked for should conform with the amounts allowed on the original requisition, a copy of which is on your ship, unless special conditions require otherwise.

14. Form K should be made out in quadruplicate. This is necessary in order that the medical aid may retain sufficient copies on file.

15. Bills of health must be procured from the medical aid before leaving for any foreign port. When clearing for a port in the United States bills of health are not necessary. If ships leave New York for another port of the United States to eventually make a foreign port, the bills of health should be procured from the last port in the United States.

16. When ships of the N. O. T. S. are coaling, it is rigidly required that the pharmacist's mate remain aboard ship and stand by for any accidents during the entire time.

18. *Purification of water.*—Whenever a vessel takes on water in a foreign port make all the inquiries possible among local board of health physicians, or, in their absence, among local private physicians, concerning the purity of the water supply and the prevalence of intestinal and epidemic diseases.

If any doubt exists in your mind, purify the water by the use of the small ampoules of calcium hypochlorite furnished you.

These ampoules contain 40 and 200 grains, enough to sterilize 100 and 500 gallons of water, respectively. Empty the contents of an ampoule into a mortar and add enough water to make a soft paste. Grind it thoroughly and add to water in tanks in sufficient quantity to sterilize the amount contained therein. For example, 800 gallons of water in a tank would require the addition of the contents of one large and three small ampoules.

19. *Typhoid prophylaxis.*—See that all the members of your crew are given antityphoid inoculations—one-half mil the first injection, 1 mil the next two injections. Be sure to enter the completion of the injections in the man's health record.

Attention of pharmacists' mates is called to the new antityphoid vaccine (lipo-vaccine) now being issued to N. O. T. S. vessels. The dose of this vaccine is 1 mil and only one injection is given. The three-dose vaccine, requiring 2½ mils in all, is no longer supplied.

With the new vaccine the skin must be carefully sterilized with tincture of iodine, after a scrubbing with alcohol and gauze. Warm vaccine slightly to make it flow easily.

One mil of the oily vaccine is drawn up with the syringe after the same has been boiled. It is best to adjust needle on syringe tightly and then draw 1 mil of the vaccine with the syringe right through the needle. The vaccine being oily, is a little harder to handle than the old vaccine. After injecting, press a gauze sponge on the puncture as you withdraw needle to keep the vaccine from flowing back out of the skin. The usual location, on the upper arm below shoulder, is the best.

Occasionally a small cold abscess will form at the site of the injection. It is best not to open these as they are sterile and do not cause trouble.

21. *Early diagnosis of tuberculosis.*—As a result of influenza a greatly increased incidence of tuberculosis may now be expected. Medical officers are directed to be vigilant to detect incipient disease.

The early diagnosis of tuberculosis among Navy personnel is of the greatest importance. The treatment and care of an incipient case is comparatively simple and inexpensive, but to allow a patient to progress past the stage of incipency is a disaster fraught with dire consequences to the subject, and a source of interminable expense and care to the Government.

Influenza, like measles and scarlet fever, predisposes to tuberculosis. If a convalescent patient does not rapidly regain his normal health and vigor, if he remains below normal weight, if he continues to have a cough or to be afflicted with frequent colds, or if he tires easily he should be considered as potentially tuberculous. Such a patient should be held under the closest observation in order to make a diagnosis to confirm or exclude tuberculosis.

Most helpful among the measures to clear up a doubtful diagnosis in obscure cases is a temperature record taken every two hours from 2 p. m. to 8 p. m. daily for at least two weeks. It is important that the thermometer should be left in the patient's mouth at least five minutes, and that all the other customary precautions be carefully observed to insure correct readings. A daily rise above 37.6 C. or 99.6 F. should be regarded with suspicion. The effect of work or other exercise on the subject's temperature should be carefully observed. If fever is found coexistent with a rapid pulse, a lowered blood pressure, or dyspnea from slight exertion, the case should be considered extremely suspicious even in the absence of physical signs of the disease.

Sputum when obtainable should be frequently examined for the tubercle bacillus. If microscope facilities are not available at the station smears should be mailed to a laboratory. One negative examination is of no great significance. A patient's sputum should not be considered negative until after at least four examinations.

If, after careful study, the symptoms persisting, it is impracticable to confirm or exclude tuberculosis, the case should be transferred to a naval hospital with diagnosis undetermined for further study.

Every ship after it returned to port from a voyage was reinspected. In this way each ship received a complete sanitary inspection every two or three months. Whenever an adverse report was sent in by the medical aide the supervisor forwarded this report to the commanding officer of the ship for comment and action. This had a very salutary effect upon the officers of N. O. T. S. vessels. Frequently a ship would be reported by one of the medical officers as very dirty and then upon her return to port seven or eight weeks later she would appear in excellent condition. The inspection also furnished another means of securing data on the work of pharmacists' mates acting independently on N. O. T. S. vessels. On the whole, I consider the inspection system the best single feature of the work done by this office.

It was pleasant to note the almost complete absence of friction between the medical inspection officers and commanding officers regarding action upon suggestions received during this inspection, even when in some cases the report was quite severe. In any case when a peculiarly poor condition was found to exist aboard a ship great care was taken that a second inspection was immediately

made so that no injustice should be done. Frequently the commanding officers of ships would come to the office of the medical aide, 45 Broadway, and express their satisfaction not only with the inspection but with the work of their pharmacist's mate. These visits provided an occasion to see to it that pharmacists' mates were given due consideration and their recommendations in sanitary matters acted upon.

Three, and sometimes four, medical officers were detailed for regular inspection duty. Also an arrangement was made with the naval medical officer on duty with the local quarantine officer whereby he was to report any unfavorable conditions he might happen to find on his boarding visits.

DISPENSARIES.

A glance at the map of New York reveals the rather dispersed locations of loading places for N. O. T. S. vessels. The first is at Bush Terminal Docks, Brooklyn, N. Y., another at the Hoboken docks, just above the Army transport piers, where most of the loading and repairing of N. O. T. S. vessels was done, and besides these two places quite an assembly of ships is constantly at anchor somewhere between the Statue of Liberty and Staten Island.

With the number of ships in port ranging from 41 in August to 67 in December, 1918, carrying an average crew of 100 officers and men, a great many casualties and diseases occurred, both aboard ship and ashore. In order to take care of these it became necessary to establish three dispensaries where immediate medical assistance could be secured by N. O. T. S. pharmacists' mates. A dispensary was built on Pier 6, Bush Terminal, another near the Rosebank Quarantine Station, and the use of the Stevens Institute Naval Auxiliary Dispensary was secured, making a third dispensary available. This latter took care of all ships docking at Hoboken.

The Rosebank Dispensary took care of all ships lying off Liberty and Tompkinsville, and the Bush Terminal Dispensary provided medical assistance for all ships loading there.

These dispensaries were placed under the charge of a medical officer who had three hospital corpsmen to assist him. A hospital corpsman was on duty day and night, and the medical officer in charge of the dispensary could be called by telephone at any hour.

These dispensaries were provided with a small emergency operating room, a small dispensary where the ordinary microscopical work could be done, and a few beds where emergency cases could be put to rest.

Another good feature about these dispensaries was that they could be used as evacuation points for patients suddenly taken ill on N. O. T. S. vessels who had to be transferred ashore.

These cases could be handled immediately and taken off the ship to one of the dispensaries, where a doctor gave them such attention as was needed. The hospital was notified and ambulance requested. Previously some difficulty was experienced on account of patients seriously ill being allowed to remain exposed, sometimes in inclement weather, on a busy pier until the arrival of the hospital ambulance, which occasionally meant several hours. The medical office at the Rosebank Dispensary was equipped to perform such fumigations as were necessary. No ships were fumigated excepting for the purpose of rats. Altogether about one-half dozen fumigations were made, these being done by the cyanide process and were very successful. Vermin were combated by the use of sodium fluoride and a powder blower. This for roaches, ants, etc. Bedbugs, fleas, etc., were destroyed by means of a spray composed of kerosene and turpentine. The apparatus, by arrangement with the supply officer, was furnished on requisition made by each ship. A photograph illustrates the same.

The question of antipneumonia vaccination was taken up with the Rockefeller Institute, and its advisability was also discussed over the telephone with the Bureau of Medicine and Surgery. On the advice received vaccinations were begun in December and are now being carried on as rapidly as incoming ships will permit. These vaccinations are entirely voluntary, and a close record is being kept so that some deductions may be drawn from the result. The vaccine used is the lipo-vaccine furnished by the Army Medical School Laboratory.

Instructions covering the moral, educational, and medical aspects of the venereal problem were given to ships in port by an arrangement with the Commission on Training Camp Activities. Much good work was accomplished. Literature and charts were given to each ship, lectures were delivered and special instructions given to pharmacist's mates.

OFFICE ORGANIZATION.

At first the Medical Department of the N. O. T. S. required the use of only one office. After the work increased more room was necessary until at the present time four offices are occupied. No small part of the work has been the attention given to the officers and enlisted men attached to 45 Broadway, in all 1,144. Further commissioned and enlisted personnel is on duty at N. O. T. S. bases and these receive medical attention from the N. O. T. S. medical officers on duty at the dispensaries.

A record board was kept in the office showing the name of every ship in port and her probable date of sailing. A system of buttons

was arranged and spaces set off under the headings: "Sailing date," "Inspected," "Fumigated," "Medical officer," "Medical outfit," "Repairs fin.," "Bills of health," "Inspection Off." Each space was closed with a red button. As new arrivals in port were assigned daily to inspection officers, the initials of the inspection officer were put opposite the name of the ship. At the completion of the inspection the red button was removed and a green button put in. When the medical outfit was placed aboard the red button was removed from that space and a green button put in. In this manner when all the wants of a ship had been attended to, a row of green buttons occupied all the spaces opposite the name.

With a large number of ships in port it can readily be seen that some such system of checkage had to be provided, otherwise many a ship would have left port without proper equipment.

A final word should be said regarding the duties the N. O. T. S. vessels have performed. They have been the mighty arm that reached across the ocean to feed and supply the troops that went across. Their range of cruising varied from Archangel to farthest South America. Often a ship acted independently for months, exposed to all the dangers of submarine attack. Their crews were exposed to all conditions of climate, weather, and war.

Some of the most striking combats of the war were fought by N. O. T. S. ships, the most important of which were the U. S. S. *Ticonderoga's* battle with a German submarine, in which nearly all of the officers and crew of the U. S. S. *Ticonderoga* were wounded and the ship had to be abandoned; the fight the U. S. S. *F. H. Buck* had with a German submarine, which resulted in the sinking of the submarine after an hour's fight; the engagement of the U. S. S. *George C. Henry* with a German submarine, during which 17 of the *George C. Henry's* crew were wounded, and the subsequent ramming a few days later of the U. S. S. *Herman Frasch* by the U. S. S. *George C. Henry*.

The U. S. S. *Westward Ho* was torpedoed and abandoned; the U. S. S. *Westbridge* was torpedoed and abandoned, suffering three dead; the U. S. S. *Lake Forest* had a gun duel with a submarine, and so did the U. S. S. *Dochra*, the U. S. S. *Kanawha*, and the U. S. S. *West Haven*.

The U. S. S. *Buena Ventura* was torpedoed during a howling gale. It took two torpedoes to sink her. Three officers and 22 men were lost when the ship was abandoned.

These are not by any means all the encounters that took place. But this report does not concern itself with the review of the military actions of N. O. T. S. vessels. The engagements above mentioned are given merely so that the pharmacists' mates who served aboard N. O. T. S. vessels may be given just credit for the hazardous duty which they so completely discharged.

THE DESTROYER.

By G. F. COTTLE, Lieutenant Commander, Medical Corps, United States Navy.

For years it has been found that a destroyer can, as a rule, operate successfully without a commissioned medical officer (doctor) on board. To such a vessel there is furnished one chief pharmacist's mate. A chief pharmacist's mate is not a substitute for a well-qualified commissioned medical officer (doctor) but is trained to be a first-aid man who can relieve the commanding officer of most, if not all, of the detailed management of sick and injured. Such a chief pharmacist's mate is expected to be able to:

- (a) Care for the ordinary ailments of the crew while at sea;
- (b) Administer first aid to any serious case that may occur;
- (c) Maintain on board a proper amount of medical supplies to meet ordinary conditions;
- (d) Make out for forwarding, the necessary medical forms and keep the necessary medical records.

The Bureau of Medicine and Surgery makes every endeavor to so direct the training of these chief pharmacist's mates that they may be capable of efficiently performing these medical duties. A chief pharmacist's mate should inform the commanding officer of any suspected contagious or infectious disease that may appear on board and inform him promptly when a patient is in need of the services of a doctor. Every chief pharmacist's mate is expected to be ready at all times to exert himself to the utmost to assist any person on board in need of assistance by reason of illness or injury and to so far as may be practicable segregate in the best place any member of the crew on the sick list. He is expected to calmly, quickly, and efficiently aid the commanding officer in the maintenance of the morale of the crew in the presence of disease or injury on board. In the event of a death occurring on board, he is expected to assist the officer designated by the commanding officer to carry out the provisions of Naval Regulations 4551-4553 and General Order 392.

The Bureau of Medicine and Surgery realizes that some of these men may feel their responsibilities too heavily; that others may take their responsibilities too lightly; but the experience of many years in dealing with medical problems on board destroyers leads the Bureau of Medicine and Surgery to feel that the chief pharmacist's mates assigned will in all probability continue to measure up to the high standard long maintained by the chief pharmacist's mates who in the past have acted as the sole representatives of the medical department on board destroyers at sea.

It is expected that the chief pharmacist's mate on a destroyer will, as a rule, be assigned duties by his commanding officer in accord with the spirit of Naval Regulation No. 1540, but at times it may be neces-

sary for him to carry out with cheerful and willing obedience any other duties that may be assigned him by the commanding officer. Naval medical officers on board mother ships of the destroyer force take an especial interest in the guidance and instruction of chief pharmacist's mates assigned to destroyers. These doctors are called upon at times to make inspection of the medical departments, and it is seldom that they find a failure on the part of the hospital corpsman to efficiently carry out his medical duties. The method of inspection of the clerical work of chief pharmacist's mates in the destroyer force has in the past assisted these hospital corpsmen to accuracy in their medical returns and has helped them obtain needed medical supplies and to make proper distribution of sick or injured.

When a chief pharmacist's mate has served for a period of two years or more in the destroyer force he has been away from daily contact with commissioned medical officers (doctors) for a long enough period, and at the end of such period he is generally transferred from the destroyer force to other duty, generally duty ashore in the United States at a station where there are doctors and where he can increase his knowledge of medical department duties and utilize what he has learned of medical department clerical duties in a larger medical field than that found on board the destroyer.

During the period of the war destroyers in European waters had a long, hard pull, and every officer and man in that force is deserving of the greatest praise for the steady, sure efficiency shown by that group of naval vessels. True to navy form, it has been almost impossible to extract anything from the men of the Hospital Corps or from the doctors who have served with this force in the war zone descriptive of their work or experiences. The typical answer is, "It was all in the day's work." How many lives were saved by destroyers that went to the rescue of torpedoed vessels and vessels in collision or endangered by other war-time hazards of the sea is unrecorded, but certain it is that in many instances the bad effects upon survivors of cold and wet was lessened by the ability and first-aid care of the chief pharmacist's mate on board. Cases of severe exposure to cold and shock from injury, burns from escaping steam, were many and were cared for by the chief pharmacist's mates of the Navy and lives saved that would otherwise have been lost. The destroyers had their share of influenza, and the men on board were grateful for the efficient care and watchful interest shown in them by the men of the Hospital Corps when that dreadful malady appeared.

The following statement is the only one that it has been possible to extract from the reticent group of hospital corpsmen who served in the North Sea, in the Bay of Biscay, in the track of the transports and cargo ships that were convoyed across the North Atlantic

through the war zone, during the many months when a destroyer had two days in port and seven days out, and when, without "running lights" at night, in fog, mist, and storm, they patrolled the highways of the sea seeking and getting the Hun submarine.

NARRATIVE OF CHIEF PHARMACIST'S MATE O. DRIVER, UNITED STATES NAVY.

On October 9, 1918, about 6 a. m., just after daylight, I was asleep in my bunk when "General quarters" was sounded. I rushed to the "top side." Just before I got on deck I felt a jar to the ship. When I reached the deck I saw the forward part of the ship in flames. We had been struck by the *Aquitania*.

The crew's sleeping quarters forward were cut in two by the collision and below the crew's sleeping quarters were the forward oil tanks, which were also cut in two by the collision. The oil in these tanks took fire, and before the men could leave their quarters many of them were burned by the burning oil. In the crew's washroom I prepared to receive these men and dressed their burns with picric acid, and upon the arrival of the U. S. S. *Duncan* the injured men were immediately put on board of her. The men who were in the forward part of the ship when she was cracked open by the shock of the collision were the most seriously damaged. Ten men and two officers were never found. They were probably burned or caught in the wreckage as the forward part of the ship went down. About 15 or 20 men in the forward part of the ship were more or less burned and injured and swimming about when they were picked up by the U. S. S. *Kimberly*.

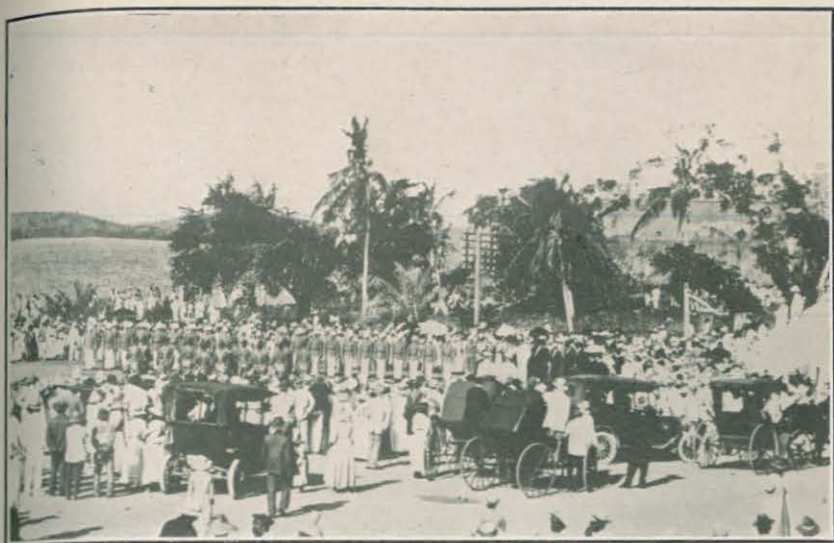
We returned 35 miles to port, to Portland, England, under our own steam with our bow gone. Chief Pharmacist's Mate Chester on the *Duncan* and Pharmacist's Mate (First Class) Kitchen on the *Kimberly* took care of the burned and injured men on the way to port.

ONE OF OUR NEW POSSESSIONS.

ST. CROIX, VIRGIN ISLANDS OF THE UNITED STATES.

By D. R. Bugg, Pharmacist's Mate (2 c.), United States Navy.

The island of St. Croix is about 20 miles in length and has two towns, one at either end of the island. On the west end is Frederiksted and on the east is Christiansted. There is a municipal hospital at either place, and in Christiansted a naval dispensary, where the marines of the island are taken care of. The naval dispensary is in charge of one Navy doctor and three hospital corpsmen, and since this island was taken over by the Americans, March 31, 1917, not one service man has died, which speaks well for the Medical



Ceremonies at transfer of Danish West Indies to the United States.



A plantation, St. Croix, V. I.



Native, Virgin Islands of United States.

Corps of the Navy. The hospital corpsmen have had some severe cases of fever to deal with, and get considerable first-aid work, quite a bit of which they would not get in a hospital in the States. The average number of patients is eight, but during the month of July there was an epidemic of dengue fever, the hospital was filled, and it became necessary to rent a near-by building, in which we had about 12 beds, all full. Dengue fever is very seldom fatal, but is extremely disagreeable at times.

There are also two hospital corpsmen stationed at the marine barracks in Frederiksted; also one at Watch Ho and one at Shoys, which are outposts on opposite ends of the island.

About 2 miles west of Christiansted we have Richmond Reservation, which consists of a leper colony, insane asylum, prison, and what is known as the sore-foot hospital. All of the prisoners, lepers, and insane from the Virgin Islands are taken care of at this place, as are also those patients from St. Croix who have become old and unable to support themselves, the majority of whom either have elephantiasis or old leg ulcers. One medical officer and one hospital corpsman are stationed at this place, the doctor being in charge of the reservation, and the hospital corpsman doing the clerical work and some laboratory work. A first-class laboratory is now under construction at Richmond, which, when completed, will take care of all the laboratory work on the island, including Wassermann tests, for which there is a great need.

The work at the municipal hospitals (which are for natives) is practically the same. Sick call is held at 10 a. m. daily, and the patients are 50 or 60 each day, sometimes more. At the Frederiksted Hospital there are two doctors and three hospital corpsmen, and at Christiansted Hospital one doctor and two hospital corpsmen. Duties at the municipal hospitals are many and varied, including ward work, operating room, dispensary, pharmacy, laboratory, and clerical duties. The hospital corpsmen also do all autopsies, under the supervision of the medical officer.

Arsphenamine is given every Wednesday, while Tuesdays, Thursdays, and Fridays are operations days. It is very seldom that operations are not scheduled for at least a week in advance. In the operating room one hospital corpsman gives the anesthetic and the other scrubs up, alternating monthly. At sick call we oftentimes come across extremely amusing incidents, our chief amusement being the extraction of teeth. On the other hand, some of the cases are far from pleasant. One case in particular, I recall, was that of an old man about 60 years of age who answered sick call one morning about three weeks ago. His right leg had been taken off some years ago, close to the body, leaving only a short stump to which was attached

a wooden peg. The left leg measured 32 inches in circumference (larger than his body) and was covered with ulcers varying from one-half to 2 inches in diameter from the ankle to the knee. It was wrapped in several folds of old rags which he had picked up somewhere, and on removing the rags the odor was so terrible that everyone had to leave the dispensary. A bichloride soak was ordered for his foot, and it was necessary to use a wash tub, an ordinary bucket being too small.

The natives are different from our southern negroes, and it is surprising to hear them talk, for they speak perfect English, the construction of their sentences is just right, and they are never at a loss for the proper word to express their meaning, yet it is difficult to understand them until one becomes accustomed to their accent or "spick lingo," as it is called by the American boys. They are very kindly disposed and thank one graciously for any good turn shown them. They are of a dark Indian type, many mulattoes, and others as black as crows. There is much poverty among them, and they are apparently underfed, which is not surprising when the average wage has been as low as 20 cents a day. Good food is very expensive and hard to get, therefore they live principally on fruit and fish, which are on the market in abundance and very cheap.

These natives are a very superstitious people and have many strange characteristics. For instance, the lower-class natives, without exception, sleep in small rooms with every door, window, and shutter closed tight, believing that the night air is dangerous and the moonlight shining in will either kill them or turn their faces around to the back of their heads. The rooms are very small and usually five or six people live in a single room. This is a tropical country, only a few degrees north of the Equator. Sanitary conditions are far from being what they should, but until the Americans came no attention whatever was paid to this most important matter. While much has already been accomplished under the supervision of a Navy medical officer, he is a very busy man and has a big job before him all the while.

The natives seem only too glad to get into our hospitals, as they are well fed there and treated kindly, receiving the best of medical attention, and they speak in glowing terms of the United States Naval Medical Corps, which has proved a great blessing to them.

We get mail from the States every two weeks, and it is generally two to four weeks old when we receive it. It comes from New York to Porto Rico, via English and American steamers, and from Porto Rico to St. Thomas in a 40-foot steam launch. It is then carried over to St. Croix by the *Creole*, a small sailboat, which rarely, if ever, arrives on time. We console ourselves with the old saying "Better late than never."

We have a naval brass band of 40 pieces composed of natives of St. Croix. They play all the late music and popular American airs, and it is a great pleasure to be on the wharf in the evenings where they give concerts two or three times each week.

One of the best things in St. Croix, if not the best, is a Service Club, which was opened two months ago by the marines and sailors on the island. They have a beautiful building, very large, and built of stone and concrete, well located, and nicely finished throughout with all modern conveniences. The club was started with no resources other than small individual contributions, and it is now self-sustaining and has money deposited in the bank. It is furnished nicely and has a large victrola, a billiard and pool table, and a good stock of canteen goods, all paid for. Plenty of magazines are always on hand, and over 200 volumes of good books to read; the books were contributed by the American Library Association. This week a handsome player piano was received from the States, donated to us by the Young Men's Christian Association. If they could only know how much it is appreciated!

THE HOSPITAL CORPS RECRUIT.

Hospital Corps recruits enter the Navy from every little town, village, and city all over the land. Coming from so many places, it is necessary to maintain Hospital Corps schools at the four training stations. From the training stations the hospital corpsmen go to naval hospitals and later from hospitals to receiving ships and to ships and to shore stations overseas, naval air stations, to duty in the Tropics, to the island possessions of the United States, or with marine expeditions. It takes months to get men into the Navy and months to get them out, for the ships of the Navy go into every ocean, and the bases and stations outside the United States extend from China to Alaska, from the Caribbean to the islands of the South Sea.

The proper sort of man for first enlistment in the Hospital Corps of the Navy is a young man who has a good grammar-school education and possibly one who has a high-school education as well—a clean, sober, earnest, manly young man who feels that he is willing to risk his life and expend his energies in the Navy's fight against disease, in order that his comrade may be best able to risk his life and expend his energies in the preparation of the Navy for combat with an enemy. While the hospital corpsman does not fire a gun he nevertheless shares all of the risks of the sea, the dangers that his ship runs from submarine attack and enemy shell fire, and the ordinary hazards of the sea; he goes with the marines on their expeditions

and accompanies them on the field of battle and is everywhere exposed to the same dangers to which other men of the Navy and Marine Corps are exposed, and in addition finds himself on the firing line in the battle against disease. The commendation of the hospital corpsman who has jumped overboard to rescue a drowning shipmate and who returning to his ship continues the work of rescue by an intelligent application of artificial respiration is as worthy of special commendation as he who is commended for an act of daring against the enemy. "At a time when the losses threatened to prevent the success of this operation the heroic conduct of these hospital corpsmen steadied the line and spurred the attacking platoons on through barrage fire," at the capture of Bouresche, June 6, 1918. This quotation from the SUPPLEMENT for October, 1918, page 101, illustrates that the coolness, nerve, and spirit of a hospital corpsman is sometimes as important in the winning of a battle as the force and rush of the men who go over the top with the fixed bayonet. In fact, it is sometimes easier for a man in a group of other men whose motto is "We kill or get killed," to rush forward to battle than for a man to stay on the job night and day in the inside of a ship, at the bedside of a man sick with a dangerous disease, with a knowledge that the fatigue brought about by his vigil is making him more susceptible to contract the disease himself.

In civil life the hospital corpsman has no exact counterpart. The doctor in a civil community is surrounded by persons especially trained to assist him in the care of the sick. He can call upon the pharmacist to put up a prescription, the laboratory technician to make a special examination for him, the X-ray technician to aid him in diagnosis, the stenographer and typewriter to assist him with his records, the trained nurse or the relative or neighbor to help him at the bedside; he may call upon specially trained attendants to assist him in the care of the insane or a tubercular or contagious case; he will find persons able to carry out the technique of the operating room. In the civil hospital the doctor has the assistance of the hospital superintendent and his staff and someone to run the hospital's commissary and feed the sick, and with the hospital there is generally a board of trustees and committee whose special purpose is to see that he has every sort of assistance needed. At sea on a naval vessel, or in the field with the Marine Corps, all these are lacking, and in some fashion the naval surgeon must meet the situation and he must so train the men of the Hospital Corps that with them he can accomplish as much away from civil communities with all their assisting agencies as will give the sick or injured man of the naval service the attention to which he is entitled and which the people at home expect him to receive. It is impossible for every ship of the

Navy to have hospital corpsmen who are expert in all these lines, but it is surprising how many men of this corps become reasonably proficient in many of the naval parts of the vocations above mentioned.

It is the system by which hospital corpsmen are trained under the supervision of the Surgeon General of the Navy, that these men become as proficient as they are and which attracts to this branch of the service so excellent a type of young man. It is up to the newly enlisted hospital corpsmen to resolutely attack the task of learning the variety of things for which he will be needed and to at the same time carry on the work of the department for which he is enlisted, whether it involves the use of the swab on the dirty deck, of soap upon a sick man, or the holding of a retractor in a surgical wound.

To train the men of the Hospital Corps, the Navy maintains four schools. The first three, Newport, Great Lakes, and San Francisco, are for recruits and the latest one at Hampton Roads for advanced ratings. The capacity of these schools varies from 50 to 200 or 300 men each. Here the many and varied branches of the Hospital Corps are taught in well-equipped laboratories and classrooms with enthusiastic and capable naval pharmacists under the charge of a naval surgeon to carry on the instruction with the Handy Book as a textbook and guide. The amount of knowledge actually imparted to the men in these schools during their short stay, never more than six months, is considerable but can not be as complete as the Navy needs. The purpose of these schools is to instill in the men an interest in Hospital Corps matters that will, as they go on in the service, eventually enable them to qualify for advancement in rating to the upper ratings of the corps, as they gain in variety of experience.

From the Hospital Corps schools the graduates go to naval hospitals to assist in the care of the sick and to learn, under the guidance of doctors, pharmacists, and nurses, the way to apply in practice what has been taught them in the schools. The stay in the naval hospital should impart an ideal of the proper way to care for the sick, inculcate the importance of and the necessity for that scrupulous cleanliness and minute attention to detail so important for the comfort and welfare of the sick. In the naval hospital the recruit should acquire an ideal of nursing which in all his service at sea he must strive to reach when, in the more difficult environment of the ship or the beyond-seas station, he is called upon to assist the doctor in saving life or in returning to duty a sick or injured shipmate.

Can the recent graduate of a Hospital Corps school, after his second period of training and work in a naval hospital, prepare a man for a major operation, go into the operating room, prepare the instruments, make the surgical dressings, use the sterilizers, assist

at the operation, and follow the patient into the ward and there nurse him back to health and strength, and all this in the cramped and difficult environment of the sick bay of a modern man-of-war! Can he go into the dispensary and laboratory of a battleship, prepare a specimen of blood or of sputum for a microscopic examination! Can he make a chemical and physical examination of gastric juice! Can he find in a microscopic field the tubercle bacillus or the intestinal parasite? Can he prepare sterile media for the growth of a bacteriological culture? Can he use the typewriter and make out the clerical forms and returns of the Medical Department of the Navy, upon the accuracy of which depends the compilation of the Navy's vital statistics? Can he properly and intelligently aid in the inspection of meats, fish, vegetables, cereals, canned goods, etc., in a way to insure a good supply of food for the sick? Can he give a bath, make a bed, take and record temperature and pulse, give enemata, stipes, prepare hypodermic medication; can he properly transport from a small boat to a ship or from a ship to a launch or from a launch to shore a sick or wounded man? Has he the experience and knowledge which would make it possible for him to intelligently administer first aid for the emergencies that occur at sea, such as burns, scalds, exposure, drowning, cuts, bruises, fractures, etc.? Can he intelligently give first aid for heat exhaustion, heat cramps, shell wounds? When he can do these duties he is fit to go to sea or beyond seas when and where needed.

What will be the future major policies of the United States? Will our Government continue to back up the Monroe doctrine? Will the people ask for disarmament, and feel secure in the condition of world peace when the nations have completed their conference about the peace table and signed a peace treaty? Will the country insist upon the maintenance of a Navy to put force behind such a treaty and keep it from becoming a scrap of paper? Will the people insist upon universal military training or will they turn from the Army and Navy and withdraw their hearty support and interest from officers and men of the service? It is impossible to answer these questions, and whatever answers are first given will probably be changed as time goes on. In the presence of these uncertainties the Navy is not uncertain. It is making its plans for the future. It is certain that the Navy will continue in the future as it has in the past, to think, to train, to plan, to prepare. Money appropriated by Congress for the building and maintenance of ships and for the training and development of officers and men will be expended to keep the Navy in readiness to take its place in the first line of the country's defense. As the men who enlisted for the period of the war leave the Navy and return to their pre-war civilian status, the officers and men that remain in the naval service will carry on as they have always done.

The young man now entering upon a four-years' enlistment in the Hospital Corps who applies himself, who rises rate by rate until he reaches an upper rating in that corps will not only find the experience gained of advantage to him in the Navy but at the end of his enlistment that he has acquired knowledge and experience of advantage to him if he decides to return to civil life.

CLIPPINGS.

THE HOSPITAL CORPS OF THE NAVY.¹

At a meeting of the National Pharmaceutical Service Association held in the Philadelphia College of Pharmacy on Friday evening, December 20, Lieutenant Commander George F. Cottle, detail officer of the Hospital Corps of the United States Navy, and Lieutenant W. T. Minnick, commandant of the Hospital Corps unit training at the Philadelphia College of Pharmacy, presented a comprehensive and interesting account of the work of the organization in the war.

Up to 1898 the "apothecary" of the Navy was an appointee of the medical officer under whom he was to serve, being selected from the "baymen" or from civil life. The "baymen" were enlisted men detailed as nurses from other branches of the naval service, and frequently were those who had proven inefficient elsewhere. They were not selected for special fitness or training for the work. When the services of the apothecary were no longer needed, he was discharged from the naval service.

As the work of the Medical Corps increased, and more need was found for proper hospital facilities and medical aid, a permanent Hospital Corps was established by law. This was in 1898. The corps consisted of hospital apprentices, hospital apprentices (first class), hospital stewards, and 25 pharmacists, with warrant rank.

No further change was made in the organization of the corps until 1912, when the rank of "chief pharmacist" was established. This grade carried with it pay and allowances of an ensign, which is that of the Annapolis graduate when first detailed to duty.

The services rendered by the Hospital Corps had been of such value as to justify the recommendation by the Surgeon General of the Navy for the advanced rank.

In 1916, in recognition of the efficiency shown by these pharmacists, legislation was secured from Congress authorizing the appointment of as many pharmacists as the needs of the service demanded, and in 1917 the Surgeon General further recognized the importance of the service by recommending temporary rank of lieutenant (junior

¹From reports of Secretary E. Fullerton Cook, of the National Pharmaceutical Service Association.

grade) and lieutenant for 82 of the members of the corps, and the appointment of 220 pharmacists (temporary). The several ratings of the corps are hospital apprentice, second and first class; pharmacist's mate, third, second, and first class; chief pharmacist's mate (acting appointment), chief pharmacist's mate (permanent appointment); pharmacist; and chief pharmacist. For the period of the war, all pharmacists and chief pharmacists were advanced first to lieutenants (junior grade) and later to lieutenants, and a large number of chief pharmacists' mates were given temporary appointments as pharmacists.

The duties of the members of this corps, especially those who hold the higher ratings, are greatly varied and call for many qualifications and extensive training.

Nursing.—Inasmuch as women nurses are not available for sea duty, this group of men are required to perform any nursing duties which the needs of the service may demand, such as the care of the sick; giving of baths; the care of the bed and bed clothing; taking of temperature, pulse, and respiration; preparing of charts; the administration of enemas and hypodermics; the preparation of patients for the operating room; and any of the various services appertaining to nursing.

Operating room.—In addition to the preparation of the patients for operations, these men are trained to take care of the surgical instruments and equipment, to do all of the necessary sterilization, know the instruments, care for them, and to make all preparation for operations. During the operation they may serve as assistants to the surgeon. In this service, he must also be prepared to establish and equip a field hospital and aid in its management.

LIEUTENANT COMMANDER COTTLE.

Lieutenant Commander Cottle illustrated the work of the corps by a number of lantern slides and drawings, showing the possibilities and training given by the Navy under the present naval regulations and also the enormous growth of the organization during the present war. He also spoke of the splendid service rendered, under many trying conditions, by this branch of the service.

Dr. Cottle in subsequent remarks, in answer to some of the comments, set forth the spirit which should animate those who seek service in the corps in war time. The essence of his statement was that every American citizen undoubtedly wished to serve his country in some capacity during such a time of struggle as that through which we have passed, and that if his opportunity came through service in this corps, then the question of mere personal advantage or rating rightly took a second place as compared with service to be rendered. He stated

that it could not be expected that men without proper military training should immediately upon first enlistment be given a high rating; that efficient naval service required extensive military training; and that the opportunity to do one's bit in an honorable way had been welcomed by many men, and should be gratifying to the young men of the country. He called attention, however, to the fact that for men qualified both in professional and military subjects there was provided in the Navy an excellent opportunity for recognition and pay in the Hospital Corps, and that for men in the naval service and who were prepared to assume the increased responsibility of war temporary commissions and larger opportunity for service were given.

In concluding his report of the meeting Secretary E. Fullerton Cook states that it will be seen by pharmacists that the duties of members of this corps are far broader than the usual activities of the apothecary in civil life, although pharmaceutical training in accordance with the curriculum of a modern college of pharmacy embraces a large percentage of the work demanded of the hospital corpsmen. The full recognition of pharmacy in the Navy with its related activities, as the collaborator with the physician in the maintenance of health, treatment of disease, and the healing of wounds, has been established, and every pharmacist in the country should lend his aid to the naval authorities. Men who secure commissions are required to successfully pass severe competitive examinations. Naval pharmacists firmly believe in proper control over the granting of commissions to pharmacists in the Navy, and with the new light which has come to all who are interested in the Medical Department of the Navy and in the work of its pharmacists and hospital corpsmen, the National Pharmaceutical Service Association may well be proud of the work that has been done by pharmacists in the naval service and glad of the recognition the Navy has accorded them. (Jour. Amer. Pharmaceutical Association, January, 1919.)

PHARMACEUTICAL, CHEMICAL, AND COMMERCIAL ARITHMETIC.

WEIGHTS AND MEASURES—METRIC EQUIVALENTS.

While the necessity for metric equivalents is to be deplored, the existence at the present time of several systems of weights and measures compels their use.

The secret of success in using the metric system is to confine one's self to that alone. The complaining is done by those who think in the apothecaries' system and convert their conclusions to the metric by the use of equivalents. For such pharmacists and such physicians we are compelled to supply help.

For the purpose of dosage the United States Pharmacopeia deem the following equivalents sufficiently accurate:

The basis for calculation of metric equivalents for less than gram is:

- 1 gram=15 grains (accurately, 15.432 grains).
- 0.1 gram=1.5 grains.
- 0.2 gram=3 grains.
- 0.3 gram=4.5 grains.
- 0.4 gram=6 grains.
- 0.5 gram=8 grains.

The basis for calculation for fractions of grains expressed in metric quantities:

- 1 grain=gram 0.060, or 0.064, or 0.065.
- $\frac{1}{2}$ grain=gram 0.030.
- $\frac{1}{10}$ grain=gram 0.006.
- $\frac{1}{100}$ grain=gram 0.0006.
- $\frac{1}{1000}$ grain=gram 0.00006.

To obtain the metric equivalent for a fraction of a grain divide gram 0.060, gram 0.064, or gram 0.065 by the denominator of the fraction. Thus (selecting 0.060 when the number will be contained in it evenly):

- $\frac{1}{3}$ grain=0.060÷3=0.020 gram.
- $\frac{1}{4}$ grain=0.060÷4=0.015 gram.
- $\frac{1}{5}$ grain=0.060÷5=0.012 gram.
- $\frac{1}{6}$ grain=0.060÷6=0.010 gram.
- $\frac{1}{8}$ grain=0.064÷8=0.008 gram.
- $\frac{1}{10}$ grain=0.060÷10=0.006 gram.
- $\frac{1}{12}$ grain=0.060÷12=0.005 gram.
- $\frac{1}{15}$ grain=0.060÷15=0.004 gram.
- $\frac{1}{20}$ grain=0.060÷20=0.003 gram.
- $\frac{1}{30}$ grain=0.060÷30=0.002 gram.
- $\frac{1}{40}$ grain=0.060÷40=0.0015 gram.
- $\frac{1}{50}$ grain=0.060÷50=0.0012 gram.
- $\frac{1}{60}$ grain=0.060÷60=0.0010 gram.
- $\frac{1}{80}$ grain=0.060÷80=0.00075 gram.
- $\frac{1}{100}$ grain=0.060÷100=0.00060 gram.
- $\frac{1}{200}$ grain=0.060÷200=0.00030 gram.
- $\frac{1}{400}$ grain=0.060÷400=0.00015 gram.
- 4 grams=1 dram apothecaries'.
- 8 grams=2 drams apothecaries'.
- 15 grams=4 drams apothecaries'.
- 30 grams=1 apothecaries' ounce.
- 2 mls=30 minims apothecaries'.
- 2 mls=30 minims apothecaries'.
- 4 mls=1 dram apothecaries'.
- 15 mls=4 drams apothecaries'.
- 30 mls=1 fluid ounce apothecaries'.
- 120 mls=4 fluid ounces apothecaries'.
- 350 mls=12 fluid ounces apothecaries'.

METRIC ABBREVIATIONS.

The various units of the metric system are designated by abbreviations, as follows:

| Linear measurement: | | Secondary volume measurement: | |
|------------------------|----|-------------------------------|------|
| Meter..... | m | Mil..... | ml |
| Decimeter..... | dm | Decimil..... | dml |
| Centimeter..... | cm | Centimil..... | cml |
| Millimeter..... | mm | Millimil..... | mmal |
| Dekameter..... | Dm | Dekamil..... | dml |
| Hectometer..... | Hm | Hectomil..... | hml |
| Kilometer..... | Km | Kilomil..... | kml |
| Myriameter..... | Mm | Weight measurement: | |
| Volume measurement: | | Gram..... | Gm |
| Liter..... | l | Decigram..... | dg |
| Deciliter..... | dl | Centigram..... | cg |
| Centiliter..... | cl | Milligram..... | mg |
| Milliliter or mil..... | ml | Dekagram..... | Dg |
| Dekaliter..... | Dl | Hectogram..... | Hg |
| Hectoliter..... | Hl | Kilogram..... | Kg |
| Kiloliter..... | Kl | Myriagram..... | Mg |
| Myrialiter..... | Ml | | |

METRIC PRESCRIPTIONS.

RULES.

1. All liquids are dispensed by volume and are expressed in terms of mls.

2. All solids are dispensed by weight and are expressed in terms of grams.

3. All quantities must be expressed with Arabic numerals.

4. Numerals precede the abbreviations.

5. To distinguish the abbreviation for the gram (Gm.) from that for grain (gr.) the former is always written with a capital and the latter with a small initial.

6. Since the value of the numeral depends upon the position of the decimal point, great care must be taken to avoid a mistake. In prescriptions a vertical line is commonly used to divide the whole units from decimal parts of units, precisely as the vertical lines in a ledger are used to divide dollars from decimal parts of dollars. In this way the decimal point is entirely eliminated. The following form is a good illustration:

| R | Gm vel mil. |
|------------------------|-------------|
| Sodii salicylatis | 15 |
| Potassii acetatis | 6 500 |
| Vini colchici seminis | 6 400 |
| Syrupi glycyrrhizae ad | 90 |

In pharmacy it is common practice to express all quantities less than a gram in milligrams, since it leads to greater accuracy.

Success in employing the metric system depends upon an intimate knowledge of the value of each of the units of the system without comparison with units of other systems to establish their values. The student must learn to understand what is meant by a gram, a mil, and a meter, not by comparing the gram with grains, the mil with minims or fluid ounces, and the meter with inches or yards, but by close association with weights, graduates, and measuring sticks of the metric denominations. Only under such conditions can one hope to attain a satisfactory understanding of the system and thereby be enabled to accurately dispense the prescriptions as directed by the physician. This also is the physician's difficulty in most cases. He wants to use the metric system in writing prescriptions, but finds it a very difficult operation, for the simple reason that he doesn't know how. He, like the pharmacist, is constantly translating the system into another. The thinking is done in the apothecaries' system, the recording or weighing in the metric.

For the physician the thinking must be done in the metric system. That is, the doctor must know that the dose of aconite is 0.030 Gm.; the dose of infusion of digitalis 4 mils, and the size of a plaster desired 10 cm. by 10 cm., etc.

For the pharmacist all that is necessary is a complete set of properly stamped metric weights, a set of cylindrical metric graduates, and a metric rule. At the present time, with so many thousands of our physicians in the Army, where they are being compelled to learn and use the metric system, it is a very opportune time for the pharmacist to fall in line and provide himself with the proper working apparatus, to be ready for the change which is sure to come upon return of these thousands of doctors to civil life.

METRIC READING EXERCISES.

Read the following:

A. (1) 1.5 l. (2) 500 ml. (3) 0.3 l. (4) 0.06 ml. (5) 0.001 l. (6) 1.5 ml.

B. (1) 1.5 m. (2) 0.5 m. (3) 0.06 mm. (4) 0.05 m. (5) 1.005 m. (6) 0.15 dm.

C. (1) 1.5 Gm. (2) 5 dg. (3) 4 cg. (5) 1.05 cg. (6) 1.8 mg.

Write out the following in Arabic numerals:

A. (1) Forty liters. (2) Five milliliters. (3) Fifty centiliters. (4) Twenty deciliters. (5) One and five-tenths milliliters.

B. (1) One-half meter. (2) Three decimeters. (3) Fifteen centimeters. (4) One and four-tenths millimeters. (5) Five-hundredths of a millimeter.

C. (1) Twenty milligrams. (2) Four centigrams. (3) Four-tenths milligrams. (4) One gram and two hundred and three and

four-tenths milligrams. (5) Two thousand and three and two-tenths milligrams. (The National Drug Clerk, Oct., 1918.)

THE METRIC SYSTEM.

TABLES.

(Department of Commerce, Bureau of Standards, S. W. Stratton, Director.)

The fundamental unit of the metric system is the meter (the unit of length). From this the units of mass (gram) and capacity (liter) are derived. All other units are the decimal subdivisions or multiples of these. These three units are simply related, so that for all practical purposes the volume of 1 kilogram of water (1 liter) is equal to 1 cubic decimeter.

| Prefixes. | Meaning. | Units. |
|------------|---------------------------------------|--|
| Milli..... | One thousandth $\frac{1}{1000}$ | .001 |
| Centi..... | One hundredth $\frac{1}{100}$ | .01 |
| Deci..... | One tenth $\frac{1}{10}$ | .1 |
| Unit..... | One..... | 1 |
| Deka..... | Ten $\frac{10}{1}$ | 10 |
| Hecto..... | One hundred $\frac{100}{1}$ | 100 |
| Kilo..... | One thousand $\frac{1000}{1}$ | 1,000 |
| | | Meter for length. Gram for mass. Liter for capacity. |

The metric terms are formed by combining the words "meter," "gram," and "liter" with the six numerical prefixes

LENGTH.

| | | |
|---------------------------|---|------|
| 10 millimeters (mm.)..... | = 1 centimeter..... | cm. |
| 10 centimeters..... | = 1 decimeter..... | dm. |
| 10 decimeters..... | = 1 meter (about 40 inches)..... | m. |
| 10 meters..... | = 1 dekameter..... | dkm. |
| 10 dekameters..... | = 1 hectometer..... | hm. |
| 10 hectometers..... | = 1 kilometer (about $\frac{1}{2}$ mile)..... | km. |

MASS.

| | | |
|--------------------------|------------------------------------|------|
| 10 milligrams (mg.)..... | = 1 centigram..... | cg. |
| 10 centigrams..... | = 1 decigram..... | dg. |
| 10 decigrams..... | = 1 gram (about 15 grains)..... | g. |
| 10 grams..... | = 1 dekagram..... | dkg. |
| 10 dekagrams..... | = 1 hectogram..... | hg. |
| 10 hectograms..... | = 1 kilogram (about 2 pounds)..... | kg. |

CAPACITY.

| | | |
|---------------------------|--------------------------------------|------|
| 10 milliliters (ml.)..... | = 1 centiliter..... | cl. |
| 10 centiliters..... | = 1 deciliter..... | dl. |
| 10 deciliters..... | = 1 liter (about 1 quart)..... | l. |
| 10 liters..... | = 1 dekaliter..... | dkl. |
| 10 dekaliters..... | = 1 hectoliter (about a barrel)..... | hl. |
| 10 hectoliters..... | = 1 kiloliter..... | kl. |

The square and cubic units are the squares and cubes of the linear units.

The ordinary unit of land area is the hectare (about $2\frac{1}{2}$ acres).

LENGTHS.

| Inches. | Milli- meters. | Inches. | Centi- meters. | Feet. | Meters. | U. S. yards. | Meters. | U. S. miles. | Kilo- meters. |
|----------|-------------------|---------|-------------------|-------|-----------|-----------------|-----------|-----------------|------------------|
| 0.0037= | 1 | 0.3937= | 1 | 1 | =0.304801 | 1 | =0.914402 | 0.62137= | 1 |
| 0.07874= | 2 | 0.7874= | 2 | 2 | =0.609601 | 1.093611= | 1 | 1 | =1.60934 |
| 0.11811= | 3 | 1 | =2.54001 | 3 | =0.914402 | 2 | =1.828804 | 1.24274= | 2 |
| 0.15748= | 4 | 1.1811= | 3 | 3 | 28083=1 | 2.187222= | 2 | 1.56411= | 3 |
| 0.19685= | 5 | 1.5748= | 4 | 4 | =1.219202 | 3 | =2.743205 | 2 | =3.28084 |
| 0.23622= | 6 | 1.9685= | 5 | 5 | =1.524003 | 3.280833= | 3 | 2.48548= | 4 |
| 0.27559= | 7 | 2 | =5.08001 | 6 | =1.828804 | 4 | =3.657607 | 3 | =4.82804 |
| 0.31495= | 8 | 2.3622= | 6 | 6 | 56167=2 | 4 | 374444=4 | 3.10685= | 5 |
| 0.35433= | 9 | 2.7559= | 7 | 7 | =2.133604 | 5 | =5.472009 | 3.72522= | 6 |
| 1 | =25.4001 | 3 | =7.62002 | 8 | =2.438405 | 5.468056= | 5 | 4 | =6.43739 |
| 2 | =50.8001 | 3.1496= | 8 | 9 | =2.743205 | 6 | =6.496411 | 4.34959= | 7 |
| 3 | =76.2002 | 3.5433= | 9 | 9 | 84250=3 | 6 | 561667=6 | 4.97090= | 8 |
| 4 | =101.6002 | 4 | =10.16002 | 13 | 12333=4 | 7 | =7.400813 | 5 | =8.04671 |
| 5 | =127.0003 | 5 | =12.70003 | 16 | 40417=5 | 7 | 655278=7 | 5.50233= | 9 |
| 6 | =152.4003 | 6 | =15.24003 | 19 | 68500=6 | 8 | =7.315215 | 6 | =9.69608 |
| 7 | =177.8004 | 7 | =17.78004 | 22 | 96583=7 | 8 | 748889=8 | 7 | =11.35662 |
| 8 | =203.2004 | 8 | =20.32004 | 26 | 24967=8 | 9 | =8.229616 | 8 | =12.86473 |
| 9 | =228.6005 | 9 | =22.86005 | 29 | 52750=9 | 9 | 842500=9 | 9 | =14.63031 |

EQUIVALENTS.

[1 meter=39.37 inches—legal equivalent adopted by act of Congress July 28, 1896.]

Length:

| | | |
|--------------------|--------|---------------|
| Centimeter..... | 0.3937 | inch |
| Meter..... | 3.28 | feet |
| Meter..... | 1.094 | yards |
| Kilometer..... | 0.621 | statute mile |
| Kilometer..... | 0.5396 | nautical mile |
| Inch..... | 2.540 | centimeters |
| Foot..... | 0.305 | meter |
| Yard..... | 0.914 | meter |
| Statute mile..... | 1.61 | kilometers |
| Nautical mile..... | 1.853 | kilometers |

Area:

| | | |
|------------------------|--------|--------------------|
| Square centimeter..... | 0.155 | square inch |
| Square meter..... | 10.76 | square feet |
| Square meter..... | 1.196 | square yards |
| Hectare..... | 2.47 | acres |
| Square kilometer..... | 0.386 | square mile |
| Square inch..... | 6.45 | square centimeters |
| Square foot..... | 0.0929 | square meter |
| Square yard..... | 0.836 | square meter |
| Acre..... | 0.405 | hectare |
| Square mile..... | 2.59 | square kilometers |

Volume:

| | | |
|-----------------------|--------|-------------------|
| Cubic centimeter..... | 0.0610 | cubic inch |
| Cubic meter..... | 35.3 | cubic feet |
| Cubic meter..... | 1.308 | cubic yards |
| Cubic inch..... | 16.39 | cubic centimeters |
| Cubic foot..... | 0.0283 | cubic meter |
| Cubic yard..... | 0.765 | cubic meter |

| | | |
|--------------------------|----------|--------------------------|
| Capacity: | | |
| Milliliter | 0. 0338 | U. S. liquid ounce |
| Milliliter | 0. 2705 | U. S. apothecary dram |
| Liter | 1. 057 | U. S. liquid quarts |
| Liter | 0. 2642 | U. S. liquid gallon |
| Liter | 0. 908 | U. S. dry quart |
| Dekaliter | 1. 135 | U. S. pecks |
| Hectoliter | 2. 838 | U. S. bushels |
| U. S. liquid ounce | 29. 57 | milliliters |
| U. S. apothecary dram | 3. 70 | milliliters |
| U. S. liquid quart | 0. 946 | liter |
| U. S. dry quart | 1. 101 | liters |
| U. S. liquid gallon | 3. 785 | liters |
| U. S. peck | 0. 881 | dekaliter |
| U. S. bushel | 0. 3524 | hectoliter |
| Weight: | | |
| Gram | 15. 43 | grains |
| Gram | 0. 772 | U. S. apothecary scruple |
| Gram | 0. 2572 | U. S. apothecary dram |
| Gram | 0. 0353 | avoirdupois ounce |
| Gram | 0. 03215 | troy ounce |
| Kilogram | 2. 205 | avoirdupois pounds |
| Kilogram | 2. 679 | troy pounds |
| Metric ton | 0. 984 | gross, or long ton |
| Metric ton | 1. 102 | short, or net tons |
| Grain | 0. 0648 | gram |
| U. S. apothecary scruple | 1. 296 | grams |
| U. S. apothecary dram | 3. 89 | grams |
| Avoirdupois ounce | 28. 35 | grams |
| Troy ounce | 31. 10 | grams |
| Avoirdupois pound | 0. 4536 | kilogram |
| Troy pound | 0. 373 | kilogram |
| Gross, or long ton | 1. 016 | metric tons |
| Short, or net ton | 0. 907 | metric ton |

AIDED WOUNDED AT FRONT; DECORATED.

"For his zeal and coolness in dressing wounds on the battle field under heavy machine-gun fire," John Quincy Williams, United States Navy, of this city, has been awarded a Croix de Guerre with gilt star, a citation certificate, and a translation of it by the French Government.

The decoration was received here by the Navy Department and forwarded to Williams, who is a pharmacist's mate, third class, in the Navy.

He served as a member of the Hospital Corps of the Sixth Regiment, United States Marines, on the firing line in France.

Mrs. Alto A. Williams, his wife, resides at 611 A Street NE. (Washington Times, Apr. 5, 1919.)

374 UNITED STATES SHIPS IN WAR.

80,711 FIGHTING MEN AFLOAT.

(Correspondence of the Associated Press.)

LONDON, *February 24.*

The United States had 374 vessels on duty in European waters and a personnel of 80,711 afloat, at bases, or headquarters when the armistice was signed, according to a summary of United States naval activities prepared at headquarters here. Numerically the submarine chasers headed the list with 120; then came the destroyers with 70; while the third class was the unheralded 55 colliers that assisted in keeping a steady stream of coal moving from Cardiff to maintain the allied armies and prevent France from freezing.

Of the 15 classes of ships enumerated in the report, the work of the destroyers stands first in dramatic interest. The 20 that were here on July 1, 1917, immediately became active in the war game, and that activity constantly increased as the number of boats gradually swelled until it reached the maximum number on November 11, 1918.

With 25 converted yachts and a few other vessels, they escorted 900,000 troops of the United States Expeditionary Force to Europe without the loss of a man from enemy action, and they escorted 27 per cent of all United States, allied, and neutral shipping to France and England from April 6, 1917, to November 9, 1918. In this and other work they steamed approximately 275,000 miles every 30 days.

The convoy system was not adopted until shortly after the United States entered the war, but in the year and seven months from then until the end 18,653 ships were brought over in 1,474 convoys that numbered from 1 ship to as many as 40. United States destroyers based at Queenstown and Brest escorted more than 600 single ships through the danger zone, and in this work encountered some of their greatest hazards. Only the largest, fastest ships were sent across alone, and in rough weather the destroyers were considerably battered when forced to maintain high speed against heavy seas.

THREE FIGHTING SHIPS LOST.

Reports of contact with the enemy by American vessels total 256, and the most of them came from destroyer commanders. A submarine was actually in the vicinity in 183 of these cases, but the others have been listed as false alarms. Methods of determining the presence of a submarine are varied, but usually are based upon charts, which show with surprising accuracy the day-to-day movements of the underwater craft.

The report gives a list of 22 encounters, the majority of which resulted in the submarine being "probably slightly damaged" or

"possibly slightly damaged." One is given as "possibly sunk," three as sunk, and one captured. The accuracy of information of the movements of submarines is evidenced in the case of the yacht *Lydonia*, in command of Commander R. P. McCullough, who was credited with sinking a submarine, although he never saw it. The *Lydonia* dropped depth charges after a torpedo had been fired at a convoyed ship. The submarine had been reported in that vicinity, and as it did not return to its base it was considered sunk in that engagement.

It is known three American fighting ships were lost through enemy action—the destroyer *Jacob Jones* and the armed yacht *Alcedo* and the yacht *Owasco*, which was used on patrol work. Three were sunk as the result of collisions, and the revenue cutter *Tampa* was sunk by an explosion, the cause of which has never been ascertained. (Washington Post, Feb. 26, 1918.)

HOSPITAL CORPS NEWS.

Vincent A. Nolan, pharmacist's mate, second class, who was with the Fifth Regiment of Marines, and who went through the battles of Belleau Wood, Soissons, St. Mihiel, and the Champagne sector, called at the Bureau of Medicine and Surgery recently.

Nolan went over the top nine times and is the recipient of the French Croix de Guerre and the Distinguished Service Cross, and other citations for bravery under fire. He made some interesting statements regarding the work of the Hospital Corps on the battlefield, some of which were:

"Hospital apprentice" were two words known and remembered by all Marines on the front line. In answer to this call hospital corpsmen immediately proceeded to the place of summons and rendered the first aid necessary, when possible carrying the wounded man to a protected position. Later came the litter bearers who carried them back to the battalion dressing stations and from the dressing stations they were taken in the ambulance to the hospital.

"Our equipment was the same as the Marines except that instead of ammunition in the belts we had bandages, tourniquets and iodine. Scissors were carried in the tops of our puttees. There were from 20 to 24 bandages in our belts but whenever possible we used the first-aid pack on the wounded man's belt, in order to save our supplies until absolutely necessary.

"For venous and capillary hemorrhage we packed the wound with gauze and applied a tight bandage. When necessary to use a tourniquet it was placed, not at the point of compression, but only an inch or so above the wound so that if the wounded man did not receive attention in time and gangrene developed it would be possible for the surgeons to save as much of the limb as possible. Iodine was seldom used on the patient in the field of battle but we used it freely on our own hands.

"It often happened that we had to construct litters of sticks and blankets in order to get the wounded carried back by men detailed from the front line as litter bearers. When we went over the top we were kept busy applying first aid and keeping up with our companies. We found that it was impossible for us to care for men from other companies if we hoped to care for our own, nor were we able to see that they were picked up by the litter bearers. In order that fallen men could be found by the litter bearers, we stuck the wounded man's gun in the ground beside him as a guide for the bearers. Wounded

men always called for water, which was very hard to obtain on the battle field, but we gave them what we could from our canteens unless they were wounded in the breast or abdomen.

"We found many shell-shocked men each time the Marines received a replacement. We found that the best treatment for these cases was to leave them alone; it saved the services of litter bearers for the wounded and did not weaken the strength of the company by removing unwounded men.

"Hospital corpsmen endeavored to keep near the center of the company in order that they could be easily located by the wounded and render first aid to the greatest number by covering the least amount of territory."

Report of casualties.—

HEADQUARTERS U. S. MARINE CORPS,
Washington, January 3, 1919.

From: The Major General Commandant.

To: The Chief of the Bureau of Navigation, Navy Department.

Subject: Extracts from casualty cablegrams.

1. The following are extracts from casualty cablegrams from the headquarters of the American Expeditionary Forces to The Adjutant General of the Army:

(a) Cablegram 377, December 15.—Javins, Rubert M., pharmacist's mate, Sixth Marines, severely wounded in action about October 27.

(b) Cablegram 385, December 19.—Patterson, Charles H., pharmacist's mate, third class, C. T. F., Fifth Marines, died of wounds on December 11.

(c) Cablegram 362, December 8.—Wilson, Marcious B., pharmacist's mate, second class, United States Navy, attached Sixth Marines, severely wounded November 3.

(d) Cablegram 359, December 6.—Brumeloe, Algernon G., pharmacist's mate, third class, Company B, Fifth Marines, severely wounded November 1.

(e) Cablegram 353, December 3.—Freeman, William, chief pharmacist's mate, headquarters company, Sixth Marines, severely wounded about October 20.

(f) Cablegram 366, December 10.—Hildreth, Gilbert, pharmacist's mate, third class, headquarters company, Fifth Marines, severely wounded about November 7.

(g) Cablegram 383, December 18.—Hollis, William W., pharmacist's mate, second class, Company A, Sixth Marines, severely wounded November 1.

(Signed) GEORGE BARNETT.

Transfers.—Authority for the transfer of enlisted men is vested in the Bureau of Navigation, enlisted personnel section. Naval Regulation 3581 deals with this function of the Navy Department. The Bureau of Medicine and Surgery receives information in regard to transfer and disposition of all hospital corpsmen on three different forms—N. M. S. H. C. 3, yellow card; N. M. S. H. C. 4, roster report; and Form K. It is of the greatest importance to all hospital corpsmen that these reports be made out with great accuracy and forwarded promptly in accord with the directions given.

Prior to the war when the Hospital Corps numbered about 1,600 persons, it was possible for the Bureau of Medicine and Surgery to recommend the transfer of hospital corpsmen very largely by name. Now that the number in the Hospital Corps has so greatly increased, this plan has become too unwieldy and the custom of the service of recommending transfer of men largely by rating rather than by name is being followed in nearly all cases. This change in method of transfer has many good features which will become more and more evident as the doctors and hospital corpsmen become accustomed to the new method.

A circular letter sent out by Bureau of Navigation, No. 27-19, on the subject of rulings for Hospital Corps complements is published in this number of the supplement and all hospital corpsmen should familiarize themselves with the information contained in that letter and when forwarding roster report, N. M. S. H. C. 4 on form K, the space for reporting authorized complement should always be filled in with great care and, after consulting the commanding officer's files for the latest Hospital Corps complement authorized by Bureau of Navigation. Upon the accuracy with which the authorized Hospital Corps complement is reported to the Bureau of Medicine and Surgery depends the ability of the Bureau of Medicine and Surgery to so recommend the transfer of hospital corpsmen as to best meet the needs of ships and stations for the necessary hospital corps personnel.

The Bureau of Medicine and Surgery endeavors to carry out a general policy for the transfer of hospital corpsmen as a whole, and, while the exigencies of the service and the widespread distribution of the corps makes it impossible to apply this policy to every individual in the service, the general rule is adhered to as far as is practicable. Hospital corpsmen submitting applications for transfer in accordance with the provisions of the Bureau of Navigation's Annual Circular for January, 1918, paragraphs 239 and 240, are more apt to receive favorable consideration if they will bear in mind that—

(a) All first-cruise hospital corpsmen are eligible for sea duty after completing their training in Hospital Corps schools and naval hospitals.

(b) Transfers from sea to shore duty during their first cruise should not be requested by hospital corpsmen below the rating of pharmacist's mate, first class.

(c) After reaching the ratings of pharmacist's mate, first class, and chief pharmacist's mate, hospital corpsmen are expected to do alternately two years' sea duty and two years' shore duty when service conditions will permit.

GENERAL PLAN FOR TRANSFER OF HOSPITAL CORPSMEN BY RATING AND TIME.

First Enlistment.

First year, enters service at recruiting station as hospital apprentice, second class.

Goes to naval training station for about six weeks' training in an apprentice-seaman brigade, then to Hospital Corps School, Newport, Great Lakes, or San Francisco, to graduate after about six months as hospital apprentice, first class.

Is then transferred to a naval hospital, and after a period varying from a few months to a year or more is transferred to sea or beyond seas, preferably in the rating of pharmacist's mate, third class.

Second and third years: Spent at sea or beyond seas as pharmacist's mate, second class, pharmacist's mate, first class.

Fourth year: Transferred ashore in the United States at a naval dispensary, training station, navy yard, sick quarters, hospital, etc., in the rating of chief pharmacist's mate (acting), pharmacist's mate, first class, and lower rating if necessary, to meet the needs of shore establishments.

SECOND ENLISTMENT.

First year: Retained ashore for duty at recruiting station if pharmacist's mate, first class, or chief pharmacist's mate, or other shore activity as allowed by Bureau of Navigation (Bureau of Medicine and Surgery), or he may be sent at once to receiving ship for general detail.

Second and third years: Should see him on independent duty at sea or beyond seas, if he has reached the rating of chief pharmacist's mate (destroyers, colliers, supply ships, marine forces, aviation units, or as leading hospital corpsman on larger vessels with medical officer).

Fourth year: Ashore in the United States, independent duty at small stations, navy yards, as instructor at Hospital Corps School, doing laboratory work at Naval Medical School, naval medical supply depots, offices of medical aids, training-station dispensaries, other naval stations, naval hospitals, etc.

THIRD ENLISTMENT.

Individuals who have become permanent chief pharmacist's mates transferred in accord with individual abilities and when possible individual wishes in such a way that they will have approximately two years at sea or beyond seas alternating with two years ashore. Generally these men are sent to larger ships, battleships, hospital ships, etc., or to beyond seas, Asiatic Station, or other billets requiring men with long service experience.

Rules for authorized complements.—

NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., March 6, 1919.

Bureau of Navigation Circular Letter No. 27-19.

To: All ships and stations.

Subject: Hospital Corps complements, reduction in, to aid in meeting releases from the service and postwar conditions.

1. The following rules for estimating Hospital Corps complement having been recommended by the Bureau of Medicine and Surgery and approved by this bureau, are published for the information and guidance of the service:

At sea.—(a) For cruising ships, hospital corpsmen equal to 1 for every 100 persons on board in accord with table attached.

(b) For cruising ships acting as mother ships to groups of destroyers, subchasers, eagles, mine sweepers, tugs, air craft, etc., there should be requested such an increase in authorized Hospital Corps complement as will meet the increased medical needs of the ship during the period she is designated for such special duty.

(c) For cruising ships with about 100 persons in the authorized complement, destroyers, eagles, certain cargo vessels, supply ships, etc., one chief pharmacist's mate or pharmacist's mate, first class.

(d) For cruising ships on detached duty with less than 100 persons in the authorized complement, mine sweepers, subchasers, tugs, etc., one pharmacist's mate, first class.

(e) For Navy transports and naval vessels carrying passengers:

1. If passengers are largely sick and wounded Hospital Corps complement up to a number equal to $1\frac{1}{2}$ per cent of the total authorized complement plus passengers to be carried.

2. If passengers are not largely sick and wounded Hospital Corps complement up to 1 for every 100 persons in the total authorized complement plus passengers to be carried. (NOTE.—Some vessels in the transport force now follow the rule of a Hospital Corps complement equal to 40 per cent of the total number of sick bay bunks, exclusive of isolation bunks.)

(f) For ships in reserve or in ordinary with more than 100 in the authorized complement 1 for every 100 in the authorized complement.

(g) For ships in reserve or in ordinary with less than 100 persons on board, 1 pharmacist's mate, first class, or chief pharmacist's mate for every 100 persons in a group of such vessels lying close enough together to make the medical care of the personnel possible as a group.

(h) For hospital ships a number of hospital corpsmen up to a number equal to 1 for every 3 beds for patients.

Beyond seas.—(a) For aviation units on detached duty, Hospital Corps complement up to $1\frac{1}{2}$ per cent of the total number of persons in the unit.

(b) For United States Marines Corps units up to a number of hospital corpsmen equal to $1\frac{1}{2}$ per cent of the total number of persons in the unit. (NOTE.—When special conditions such as tropical service with a regiment split up into many small and separate units, a regiment going into action without a field hospital near by, etc., additional authorized Hospital Corps complement may be requested, if needed.)

(c) For field hospitals, a number of hospital corpsmen equal to one for every five patients cared for. (NOTE.—Excess of this number should be requested and will be assigned, so far as may be practicable, whenever special isolation or military emergency makes such an assignment necessary.)

(d) For naval stations outside naval districts 1 to 13 such Hospital Corps complements should be requested as will meet special medical needs of each locality.

Ashore.—(a) For recruiting stations one pharmacist's mate, first class, or chief pharmacist's mate for each medical officer regularly assigned to recruiting duty. (NOTE.—Recently reenlisted men should be given preference in filling this complement whenever practicable.)

(b) For Hospital Corps schools, no authorized complement. It is considered that five pharmacists and a doctor can adequately instruct the average Hospital Corps school. The number of hospital corpsmen under instruction will fluctuate.

(c) For receiving ship general detail, no fixed number.

(d) For naval districts, exclusive of naval hospitals, recruiting stations, receiving ship, general detail, and Hospital Corps schools, it is considered that fixed complements do not provide sufficient elasticity to allow proper economical utilization of Hospital Corps personnel, but in general it is considered that when the number of hospital corpsmen in the naval district outside the above-mentioned activities equals 1 for every 100 naval persons on active duty within the naval district, there is a sufficient number of hospital corpsmen present to meet district needs. (NOTE.—Hospital Corps personnel additional to this ratio may be assigned to utilize district training facilities whenever practicable.)

(e) For naval hospitals, the fluctuation of number of patients to be cared for at a naval hospital varies with season of the year, epidemic conditions, military exigency, etc., and makes it seem inadvisable to give any fixed rule for authorized complement. The bureau considers that when a naval hospital has one hospital corpsman for every five patients under treatment it has a Hospital Corps personnel sufficient to adequately assist in the care of the acutely sick and injured. This basic rule for necessary Hospital Corps personnel in naval hospitals is one which should be used as a guide in submitting requests for additional Hospital Corps personnel at naval hospitals. It is considered that a minimum Hospital Corps authorized complement should be recommended somewhat in accordance with the following schedule in order that the hospital may have a minimum fixed complement Hospital Corps, below which reduction in Hospital Corps personnel would bring about a vital disturbance in the administration of the hospital. (NOTE.—Hospital corpsmen in excess of such minimum fixed complement will be assigned whenever practicable up to ratio of one for every five patients, and in excess of this ratio when practicable.)

| Low average of patients. | Chief pharmacist's mate. | Pharmacist's mate, 1st class. | Pharmacist's mate, 2d class. | Lower ratings. | Total. |
|--------------------------|--------------------------|-------------------------------|------------------------------|----------------|--------|
| 10..... | 2 | 2 | 2 | 4 | 10 |
| 50..... | 3 | 3 | 3 | 11 | 20 |
| 100..... | 4 | 4 | 4 | 18 | 30 |
| 250..... | 5 | 5 | 5 | 35 | 50 |
| 300..... | | | | | |
| 400..... | | | | | |
| 500..... | 10 | 10 | 10 | 70 | 100 |
| 1,000..... | 15 | 15 | 15 | 145 | 200 |
| 2,000..... | 20 | 20 | 20 | 340 | 400 |

3. The rapid demobilization of naval personnel now going on may at any time necessitate the reduction of hospital corpsmen below a number considered proper by the Bureau of Medicine and Surgery. It may be necessary to reduce the number of hospital corpsmen assigned to any command below authorized complements. Recruiting, however, is now bringing in a fair quota of hospital corpsmen, and it is hoped that a serious shortage will not occur throughout the service. The cooperation of all medical officers is requested in meeting the reduction made necessary by release from the service, to the end that requests for Hospital Corps personnel in excess of the above-stated rules may be limited to only the most urgent medical necessities.

4. In meeting requests for transfer of hospital corpsmen to receiving ships for general detail and to cruising ships, hospital corpsmen who have served longest on station should be sent whenever possible unless the individual is within a short time (three months) of expiration of enlistment.

5. The percentages given above are based on experience in meeting needs for Hospital Corps personnel and in maintaining an economical distribution of the 3½ per cent total Hospital Corps complement authorized by law.

6. The following table gives the assignment by rating of the complement allowed cruising vessels, paragraph 2 (a).

| Total persons on board. | Total hospital corpsmen, 1 per cent. | By rating. | | | |
|-------------------------|--------------------------------------|---------------------------|--------------------------------|-------------------------------|-------------------------------|
| | | Chief pharmacist's mates. | Pharmacist's mates, 1st class. | Pharmacist's mates, 2d class. | Pharmacist's mates, 3d class. |
| Less than 100..... | 1 | ..... | 1 | ..... | ..... |
| 100..... | 1 | 1 | ..... | ..... | ..... |
| 200..... | 2 | ..... | 1 | ..... | 1 |
| 300..... | 3 | ..... | 1 | ..... | 2 |
| 400..... | 4 | 1 | ..... | 1 | 2 |
| 500..... | 5 | 1 | 1 | ..... | 3 |
| 600..... | 6 | 1 | 1 | 1 | 3 |
| 700..... | 7 | 1 | 1 | 1 | 4 |
| 800..... | 8 | 1 | 1 | 2 | 4 |
| 900..... | 9 | 1 | 1 | 2 | 5 |
| 1,000..... | 10 | 1 | 1 | 2 | 6 |
| 1,100..... | 11 | 1 | 1 | 3 | 6 |
| 1,200..... | 12 | 1 | 1 | 3 | 7 |
| 1,300..... | 13 | 1 | 1 | 3 | 8 |
| 1,400..... | 14 | 1 | 1 | 4 | 8 |
| 1,500..... | 15 | 1 | 1 | 4 | 9 |
| 1,600..... | 16 | 1 | 1 | 5 | 9 |
| 1,700..... | 17 | 1 | 1 | 5 | 10 |
| 1,800..... | 18 | 1 | 1 | 5 | 11 |
| 1,900..... | 19 | 1 | 1 | 5 | 12 |
| 2,000..... | 20 | 1 | 2 | 5 | 12 |
| 4,000..... | 40 | 2 | 4 | 10 | 24 |
| 6,000..... | 60 | 2 | 6 | 15 | 37 |
| 8,000..... | 80 | 3 | 8 | 20 | 49 |
| 10,000..... | 100 | 4 | 10 | 25 | 61 |

VICTOR BLUE.

The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and most difficult in the history of science. The author discusses the various theories of the origin of life, and shows that the most plausible is the theory of spontaneous generation. This theory is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time. The author also discusses the theory of evolution, and shows that it is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time. The author also discusses the theory of the origin of life, and shows that it is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time.

The second part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and most difficult in the history of science. The author discusses the various theories of the origin of life, and shows that the most plausible is the theory of spontaneous generation. This theory is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time. The author also discusses the theory of evolution, and shows that it is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time. The author also discusses the theory of the origin of life, and shows that it is based on the fact that life is a complex of many different parts, and that these parts are all found in the same place, and at the same time.



Hospital Corpsmen Commended

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
November 29, 1918.

From: Adjutant General American Expeditionary Forces.
To: Commanding general Second Division.
Subject: Decorations.

The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Second Class) ERNEST B. BALL, United States Navy, attached to Company E, Fifth Regiment, United States Marine Corps, for extraordinary heroism in action near St. Etienne, France, 3 October, 1918.

Pharmacist's Mate Ball, continually exposed himself to severe machine-gun and artillery fire while dressing and carrying wounded soldiers belonging to the unit to which he was attached.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
November 29, 1918.

From: The Adjutant General American Expeditionary Forces.
To: Commanding general Second Division.
Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and

soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Second Class) EDMO E. MERKEL, United States Navy, attached to Fifth Marines, for extraordinary heroism in action near Blanc Mont, France, 3-4 October, 1918.

Pharmacist's Mate Merkel accompanied a company of marines during an advance under violent fire, going to all parts of the line, giving first aid to wounded and directing their evacuation. Although wounded, he remained on duty until forced to go to the rear.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
December 4, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (First Class) JOHN BAUME, Fifth Regiment United States Marine Corps, for extraordinary heroism in action near St. Etienne, France, 3-5 October, 1918.

Pharmacist's Mate Baume gave aid to the wounded under shell and machine-gun fire and went forward several times during the advance to locate advanced dressing stations.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
November 29, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Third Class) VINCENT A. NOLAN, United States Navy, attached to Fifth Regiment United States Marine Corps. For extraordinary heroism in action near St. Etienne, France, 5-9 October, 1918.

During the operations at Blanc Mont Ridge, Pharmacist's Mate Nolan repeatedly went through intense machine-gun and shell fire to administer first aid to officers and soldiers who were wounded and lying in exposed positions.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
December 4, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Second Class) RAY A. MESSINELLI, Fifth Regiment United States Marine Corps, for extraordinary heroism in action near St. Etienne, France, 4-5 October, 1918.

Regardless of his personal danger, he repeatedly exposed himself to machine-gun and shell fire to render first aid to the wounded.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
December 4, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Second Class) EUGENE B. REED, United States Navy, attached to Fifth Marines, for extraordinary heroism in action near St. Etienne, France, 4 October, 1918.

During a bombardment, Pharmacist's Mate Reed four times crossed an area heavily shelled and subjected to machine-gun fire to render assistance to his comrades.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
December 4, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Second Class) BENJAMIN F. ROGERS, attached to Fifth Marines, for extraordinary heroism in action near St. Etienne, France, 4 October, 1918.

Pharmacist's Mate Rogers left his shelter and went beyond our most advanced positions, giving first aid to the wounded under machine-gun and shell fire until all had been cared for and evacuated.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,
December 4, 1918.

From: The Adjutant General American Expeditionary Forces.

To: Commanding general Second Division.

Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Hospital Apprentice (First Class) ABSALOM F. BEAR, United States Navy, attached to Fifth Regiment United States Marine Corps, for extraordinary heroism in action near St. Etienne, France, 4 October, 1918.

During a heavy bombardment Apprentice Bear went to an advanced observation post, dressed the wounds of a comrade, and conducted him to the rear.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,

From: The Adjutant General American Expeditionary Forces.
To: Commanding general Second Division.
Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Third Class) GEORGE I. PETERSON, Fifth Marines, for extraordinary heroism in action near St. Etienne, France, 3-7 October, 1918.

Pharmacist's Mate Peterson was directly responsible for the saving of several lives while obliged to care for the company's wounded alone. On succeeding days he traveled from one side of the company sector to the other, through artillery and machine-gun barrage, hunting and caring for the wounded.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,

From: Adjutant General American Expeditionary Forces.
To: Commanding general Second Division.
Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Hospital Apprentice (First Class) WILLIAM V. NOLTE, United States Navy, attached to Fifth Regiment United States Marine Corps (as No. 303787), No. 1608, for extraordinary heroism in action near Blanc Mont, France, 4 October, 1918.

Apprentice Nolte rendered exceptional assistance to his wounded comrades by continually giving first aid to them under machine-gun fire.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

GENERAL HEADQUARTERS,
AMERICAN EXPEDITIONARY FORCES,

December 4, 1918.

From: The Adjutant General American Expeditionary Forces.
To: Commanding general Second Division.
Subject: Decorations.

1. The commander in chief, in the name of the President, has awarded the distinguished-service cross to the following officers and soldiers for the acts of extraordinary heroism described after their names:

Pharmacist's Mate (Third Class) GEORGE W. BAILEY, United States Navy, attached to the Fifth Marines, for extraordinary heroism in action near St. Etienne, France, 4 October, 1918.

Pharmacist's Mate Bailey voluntarily went out in front of the most advanced positions of our troops in order to render first aid to a number of wounded soldiers. He continued the work until all the wounded had been given first aid and evacuated.

By command of Gen. Pershing:

J. A. ULIO,
Adjutant General.

LETTER SIGNED LIEUTENANT COLONEL JOHN C. M'COY, MEDICAL CORPS, UNITED STATES ARMY, FORWARDED BY CAPTAIN D. M. DE VALIN, MEDICAL CORPS, UNITED STATES NAVY, NAVY BASE HOSPITAL NO. 3.

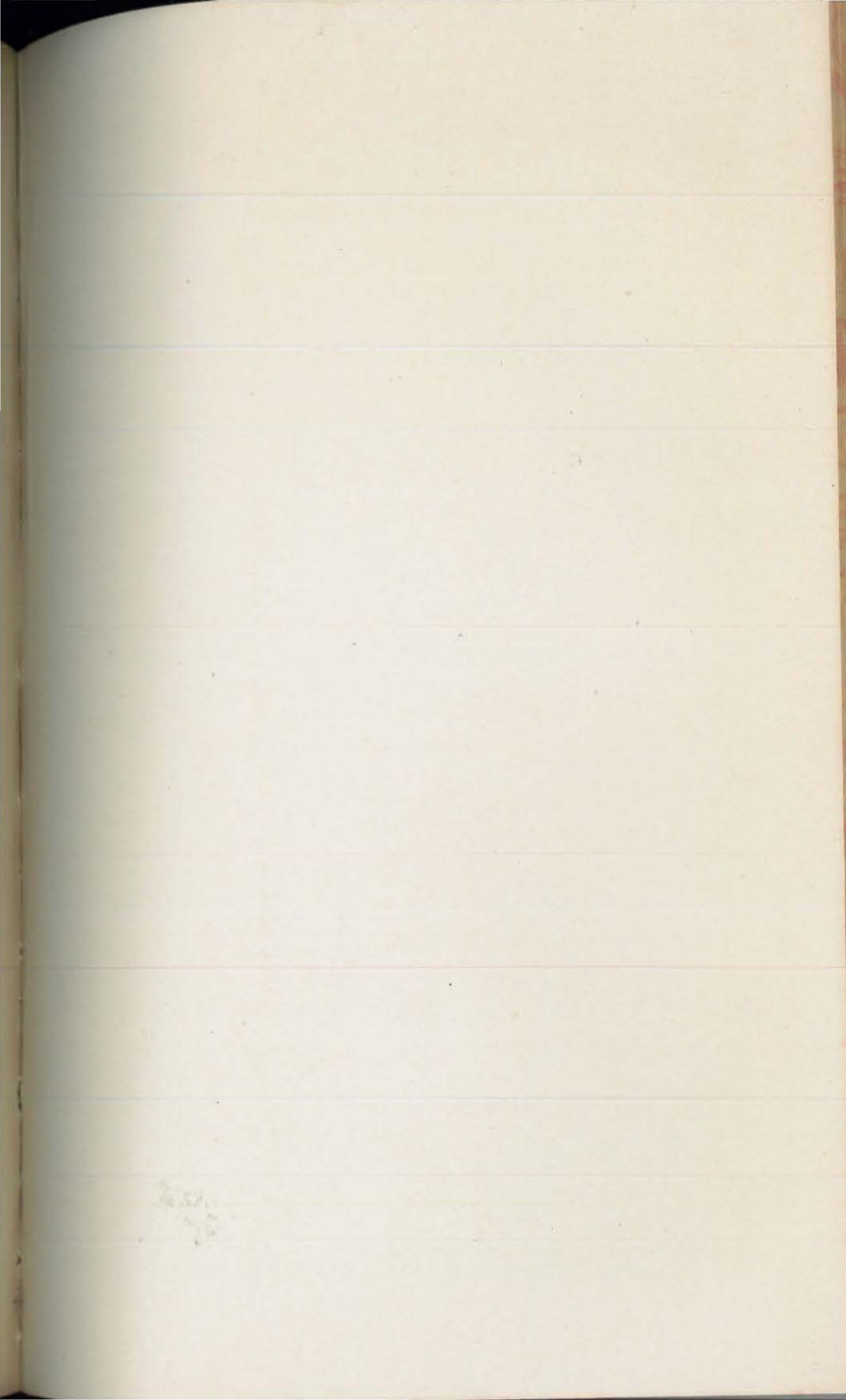
EVACUATION HOSPITAL No. 114,
Fleury-sur-Aire, France, December 26, 1918.

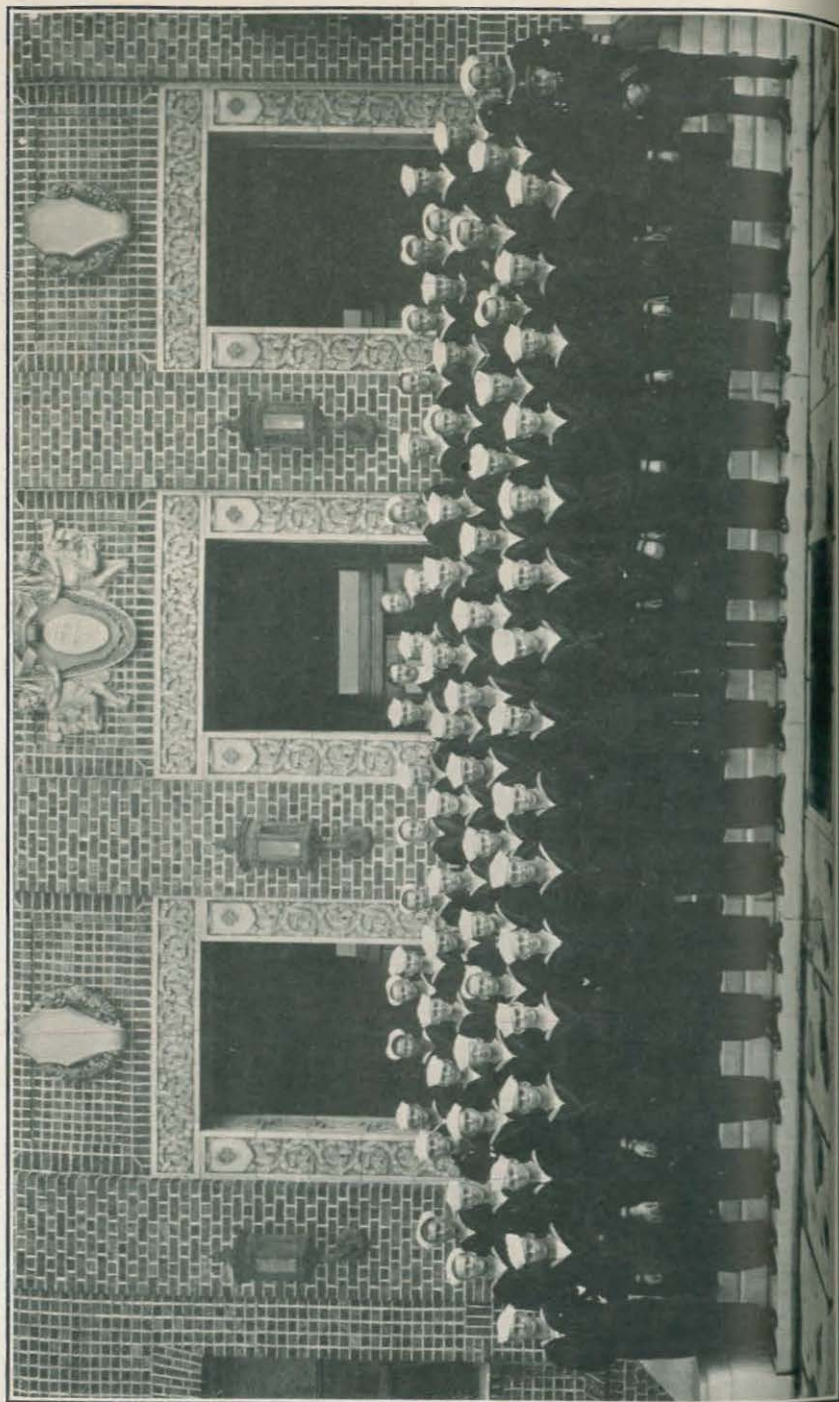
It affords me pleasure to tell you of the wonderfully fine work the operating team from your base, headed by Lieut. Commander REA SMITH, did. Reaching our hospital at the beginning of the Argonne offensive, this team went through the entire offensive with us. The hospital corpsmen deserve especial mention for their work. The hospital corpsmen were SAMUEL S. MATHEWS, pharmacist's mate, third class, and ALBERT R. FISHER, pharmacist's mate, third class, United States Naval Reserve Force.

EXTRACT FROM SPECIAL REPORT, U. S. S. "SUSQUEHANNA," NOVEMBER 2, 1918, SIGNED WILLIAM L. MARTIN.

Efficiency of the Hospital Corps. I feel that I can not too highly commend the work of my hospital corpsmen. They worked from early morning to late at night, performing the innumerable tasks necessary for the nursing and comfort of so many patients.¹ Always

¹ This commendation was made in connection with the influenza epidemic.





Hospital Corps unit assigned to USS Oregon, San Francisco, during inspection at anchor.

cheerful and willing, they did their work with never-failing courtesy and kindness, so much appreciated by the sick, and by their skillful nursing reflecting the able supervision of Pharmacist H. H. WILLIAMSON, United States Naval Reserve Force, and Chief Pharmacist's Mate W. T. McILRATH, United States Naval Reserve Force. Many lives were saved by their tireless zeal and devotion to duty.

HEADQUARTERS TWELFTH NAVAL DISTRICT,
San Francisco, Calif., January 29, 1919.

From: Commandant.

To: Personnel of the Twelfth Naval District.

Subject: Commendation of naval hospital corpsmen.

1. Circumstances have fortunately enabled the commandant to comply with the urgent request of the municipal authorities of San Francisco to provide a detail of hospital corpsmen from the United States naval training station, San Francisco, for duty in the care of civilian influenza patients at the San Francisco hospital during both the October and the January epidemic emergencies.

2. It is very gratifying to have occasion to publish the following personal testimonial of the care given by the Naval Hospital Corps to an appreciative civilian patient:

SAN FRANCISCO, CALIF., *January 23, 1919.*

HEADQUARTERS OF THE NAVY DEPARTMENT,

413 Sheldon Building.

DEAR SIRS: I, Harriet Hall, desire to express my appreciation of the splendid care given to myself and other patients by the Hospital and Ambulance Corps of the Navy. I was a patient at the San Francisco hospital from November 13 to November 19, and feel certain I owe my life to the dear "sailor boys." Their intelligence and devotion can not be expressed in words. I can only say "it is me for the Navy" from now on throughout my life.

Sincerely, yours,

HARRIET HALL.

J. L. JAYNE.

HEADQUARTERS TWELFTH NAVAL DISTRICT,
San Francisco, Calif., February 21, 1919.

From: Commandant.

To: The personnel Twelfth Naval District.

1. The following letter is quoted for your information.

CITY AND COUNTY OF SAN FRANCISCO,

DEPARTMENT OF PUBLIC HEALTH,

Central Office, 1085 Mission Street, February 21, 1919.

The COMMANDANT TWELFTH NAVAL DISTRICT, U. S. NAVY,

Sheldon Building, San Francisco, Calif.

SIR: I have the honor to inform you that at a regular meeting of the board of health held on Thursday, February 20, 1919, a resolution was adopted to the

effect that a vote of thanks and appreciation be forwarded to the commandant of the Twelfth Naval District, San Francisco, Calif., for the splendid cooperation extended the San Francisco hospital in furnishing the services of 75 hospital corpsmen and three commissioned officers from the Medical Corps, United States Navy, during the recent epidemic of influenza.

This assistance was rendered at a time when the hospital was unable to cope with the demands that were being made upon it and the services of the hospital apprentices proved to be invaluable and their conduct in the service most exemplary.

Special mention should be made of the excellent services given by Lieuts. Thornton, Visalli, and Whizman, who at all times thoroughly cooperated with the superintendent and the medical and nursing departments.

Respectfully,

BOARD OF HEALTH,
By WILLIAM C. HASSLER,
Health Officer.
J. L. JAYNE.

PROMOTIONS.

The following chief pharmacist's mates have been temporarily appointed to the warrant rank of pharmacist, United States Navy, since the list of pharmacists appearing in the January, 1919 SUPPLEMENT was compiled:

Wicker, N. O.
 Russell, G. W.
 Hoggards, H. G.
 Beard, H. B.
 Baker, E. R.
 Hill, W. W.
 Saxton, W. E.
 Ashby, R.
 Blanden, D. S.
 Postle, S. C.
 Lansdowne, D. S.
 Lawrence, J. N.
 Newcomer, H. B.
 Sendeki, J.
 Asmann, K. M.
 Burke, J. H.
 Campbell, J. R.

Dale, W. C.
 Dettmer, P.
 Meyers, W. W.
 Sale, L. A.
 Granger, A. E.
 Haines, G. B.
 Mantor, M. H.
 Mitchell, G. G.
 Porter, R. M.
 Schofield, W.
 Smith, S. E.
 Young, G. H.
 Wellmen, O. F.
 Stamps, B. B.
 Strott, G. G.
 Throckmorton, N. W.
 Johnson, P.

ADDITIONS TO THE LIST OF PHARMACISTS IN THE JANUARY ISSUE OF THE HOSPITAL CORPS SUPPLEMENT.

A list of chief pharmacists and pharmacists who were temporarily promoted to the grade of lieutenant, Medical Corps, United States Navy, was published in the January, 1919, issue of the Hospital Corps SUPPLEMENT.

The names of 13 chief pharmacists who were among the first group of chief warrant officers to be promoted at the beginning of the war were inadvertently omitted from the list. Their names, which follow, should have appeared after Stephen William Douglass.

LIEUTENANTS UNITED STATES NAVY.

Edward Rogers Noyes.
 Lawrence Oliphant Schetky.
 Oscar Gustave Ruge.
 Paul Jacob Waldner.
 Richard Sophus Frederick Puck.
 Maury Davison Baker.
 Charles Ellis Alexander.

Carl Bennett Furnell.
 Howard Elmer Sausser.
 Stephen Wierzbicki.
 Alphonsus Augustine O'Donoghue.
 Frank Fulton.
 Henry Arthur Harris.

Since the last issue of the SUPPLEMENT the Bureau of Medicine and Surgery has been informed that the following-named men have been recommended for the rate:

CHIEF PHARMACIST'S MATES.

| | |
|-------------------|--------------------|
| Allen, William. | Hargrave, V. J. |
| Andrews, W. G. | Harper, C. R. |
| Arrington, R. A. | Harrison, E. D. |
| Atkinson, L. R. | Heilman, H. J. |
| Bailey, C. W. | Hiestead, C. H. |
| Bains, A. W. | Hook, R. S. |
| Ball, W. W. | Hopkins, J. D. |
| Bamber, W. R. | Houvener, H. L. |
| Barrington, W. E. | Hurd, P. L. |
| Bettis, M. | Johnson, C. S. |
| Bird, F. M. | Johnson, L. N. |
| Blair, D. J. | Johnson, O. |
| Bocock, W. V. | Jones, E. E. |
| Brady, A. J. | Jones, H. S. |
| Bresnahan, M. F. | Jorgensen, N. W. |
| Brown, F. L. | Kelly, T. R. |
| Brown, T. C. | Kennedy, R. W. |
| Buranen, H. H. | King, W. R. |
| Butt, E. M. | Knott, O. W. |
| Call, I. B. | Kracke, R. R. |
| Cameron, K. O. | Lacey, R. G. |
| Cline, H. H. | McCallum, M. C. |
| Cook, C. S. | McCaughan, S. K. |
| Cragen, J. E. | McClarrinon, G. E. |
| Crawford, C. C. | McNeel, H. McG. |
| Crow, W. G. | Manring, F. G. |
| Daley, C. W. | Mattingly, C. |
| Davenport, D. V. | Millen, W. A. |
| De Witt, D. V. | Monahan, A. J. |
| Dieckmann, L. | Moore, S. L. |
| Dolan, A. H. | Moyer, C. W. |
| Donovan, B. J. | Mulreany, J. F. |
| Dowdy, J. H. | Murphy, C. F. |
| Drake, C. W. | Neville, R. J. |
| Dreyer, W. A. | Newland, V. E. |
| Drumheller, S. T. | Newton, H. D. |
| Dunlap, B. C. | Nichols, F. L. |
| Durham, C. R. | Norman, G. J. |
| Edstrom, S. | O'Neill, D. H. |
| Feinne, J. | Owen, L. E. |
| Frazier, M. G. | Owens, A. W. |
| French, E. C. | Parker, F. B. |
| Gammill, L. C. | Paulsen, C. A. |
| Gholson, H. A. | Perkins, F. A. |
| Handley, J. E. | Phelps, J. B. |
| Harbour, W. J. B. | Radcliff, H. L. |
| Hardin, J. J. | Ray, T. H. |

Redmond, J. S.
 Regnier, L. A.
 Robinson, R.
 Robison, H. D.
 Rotchford, F. H.
 Routh, J. S.
 Russell, T. N.
 Sagley, G. R.
 Schomaker, I. F.
 Sears, F. E.
 Shadel, P. M.
 Simmer, T.
 Smith, J. E.
 Smith, T. R.
 Spalding, J. H.
 Staley, E. J.
 Staub, R. G.
 Stewart, O. M.
 Stonerock, E. H.

Sullivan, F. L.
 Thrasher, L. G.
 Tillotson, W. C.
 Trotter, H. N.
 Turner, M. K.
 Vallier, M. O.
 Warne, R. T.
 Warner, G. B.
 Warren, C. C.
 Watson, A. G.
 Watt, E. W.
 Wemnerlind, E. W.
 Whitehurst, R.
 Whitt, F. E.
 Williford, H. L.
 Willoughby, L. B.
 Woodmansee, W. F.
 Zeller, L.

Since the last issue of the SUPPLEMENT the Bureau of Medicine and Surgery has been informed that the following-named men have been recommended for the rate:

PHARMACIST'S MATE, FIRST CLASS.

Abraham, E. A.
 Adams, D. H.
 Alton, J.
 Alford, H. C.
 Allen, W. H.
 Ames, W. E.
 Amos, G. W.
 Anderson, J. D.
 Andrew, J. E.
 Andrews, S. R.
 Argetsinger, F. M.
 Armstrong, J. E.
 Ashman, J. H.
 Ayers, S. L.
 Badgley, H. H.
 Baird, T. A.
 Bailey, J. McK.
 Bale, K. G.
 Ball, E. B.
 Barnett, C. B.
 Barrett, C. E.
 Barton, L. H.
 Beach, F. M.
 Beagley, K. E.
 Beard, R. L.
 Beck, F. W.
 Beck, R. D.
 Bell, B. D.

Bell, D. C.
 Bell, J. M.
 Bennett, J. B.
 Benson, H.
 Berry, F.
 Bierstein, E. C.
 Bisch, E. C.
 Bizzell, H. L.
 Black R. A.
 Blake G. M.
 Bloom, W. A.
 Bohn, E. B.
 Booker, F. V.
 Booth, J. N.
 Bourland, C. F.
 Bowles, M. M.
 Bragg, J. S.
 Brannan, C. N.
 Braun, L. F.
 Brochiero, R. P.
 Brown, L. W.
 Brumfield, C. L.
 Bryant, R. F.
 Buchanan, G. S.
 Buflin, K. V.
 Buranen, H. H.
 Burnham, W. E.
 Butler, W. F.

- Bynum, O. H.
 Caldwell, C. A.
 Callahan, R. M.
 Camp, F. W.
 Campbell, G. R.
 Carlsen, E. H. B.
 Carr, E. S.
 Carroll, C. R.
 Carter, S. S.
 Chilgren, E. J.
 Clark, F. A.
 Clarkson, T. H.
 Clifford, R. F.
 Cloney, E. F.
 Cloud, T. J.
 Coffee, O. W.
 Cohen, A.
 Cohen, S. J.
 Cole, C. C.
 Coleman, R. W.
 Collins, E. J.
 Colquhoun, G. C.
 Condit, D. H.
 Connor, C. C.
 Cook, H. B.
 Cooksey, W. B.
 Cooley, C. L.
 Cooley, F. C.
 Cousins, W. C.
 Coyne, P. J.
 Craddock, C. A.
 Creager, R. K.
 Crewson, E. E.
 Criminger, J. E.
 Culp, L. V.
 Cunningham, R. P.
 Dallenbach, W. O.
 Daly, J. M.
 Dautel, L. A.
 Davidson, J. M.
 Davis, C. E.
 Davis, J. H.
 Day, B. J.
 Deaver, L. R.
 De Generes, E. M.
 De Hard, J. H. D.
 De Haven, L.
 De Witt, W. T.
 Dinneen, W. J.
 Dittrich, A. R.
 Dixon, B. F.
 Dolan, A. H.
 Donnan, C. C.
 Dorian, W. L.
 Doty, F.
 Duncan, C. D.
 Duncan, T. R.
 Dunnavant, W. P.
 Early, C. C.
 Edsall, F. E.
 Elliot, P. McN.
 Erisman, C. K.
 Falconer, C. E.
 Farragut, L. D.
 Feeney, P. M.
 Feldschmidt, R. C.
 Finch, F. W.
 Flanigan, J. W.
 Folb, M. B.
 Foley, S. R.
 Forbes, H. W.
 Fort, G. W.
 Foulke, H. H.
 Fowler, H. C.
 Freeman, R. M.
 Friedman, B.
 Frisbie, G. N.
 Garriss, H. T.
 Gehrke, F. H.
 George, N. C.
 Gherrity, W. W.
 Gibson, F. E.
 Gish, E. F.
 Glenn, F. L.
 Good, W. C.
 Gorham, T. J.
 Grant, J. H.
 Gray, P. F.
 Green, R. M.
 Griffin, G.
 Grigs, E. W.
 Griset, V. A.
 Grozier, H. F.
 Guinn, U. A.
 Gunther, C. O., jr.
 Hall, R. W.
 Haller, E. L.
 Hamilton, H. C.
 Hamilton, O. W.
 Hamilton, W. E.
 Hampton, R. G.
 Harsh, C. T.
 Hart, C.
 Hartley, B. B.
 Harvey, K. M.
 Hassett, C. C.

Havel, F.
 Hayes, R. L.
 Hellman, J. B.
 Hickey, L. J.
 Hickey, M. L.
 Hight, T. J.
 Hill, M. E.
 Hite, E. C.
 Hixon, S.
 Hoen, L., jr.
 Holcomb, F. H.
 Holmes, O. F.
 Hooks, P. H.
 Hopkins, J. D.
 Hopkins, J. J.
 Hovley, P. J.
 How, R. M.
 Hewlett, J. J.
 Hruska, E. J.
 Hubbard, G. S.
 Hudgins, W. C.
 Huff, M.
 Hulme, F. L.
 Irons, A. L.
 Isaacson, A. V.
 Isreal, R. J.
 Jennison, C. S.
 Jipp, J. P.
 Johnson, C. E.
 Johnson, J. B.
 Johnston, J. W.
 Johnston, V. E.
 Jones, C. E.
 Jordon, B. O.
 Joyce, T. W. J.
 Joyce, W. K.
 Judy, J. R.
 Kane, H. G.
 Kavanaugh, R. E.
 Kelley, S.
 Kelly, F. J.
 Kilcrease, G. D.
 Killion, T. L.
 King, J. C.
 King, J. E.
 Kirkpatrick, W. F.
 Kitchens, C. E.
 Klugist, H.
 Knight, E. C.
 Knox, W. C.
 Koon, J. E.
 Kope, R.
 Kerfroth, A. E.

Kuller, E. M.
 La Forge, J. H.
 Laird, C. T.
 Lamont, C. F.
 Landrum, J. P.
 Lentz, F. W.
 Lepkovitz, J.
 Levin, L. S.
 Lockner, G.
 Logerwell, L. A.
 Loper, A. C.
 Loughridge, W. J.
 Low, M. L.
 Lymburner, O. J.
 Lynch, J. M.
 Lynch, P. J.
 Lynch, T. M.
 McCutcheon, L., jr.
 McDaniel, L. J.
 McDonald, A. P.
 McGinnis, A. A.
 McGovern, J. F.
 McGrath, J. J.
 McGuire, F. H.
 McHorney, W. L.
 McKay, L. K.
 McKay, M. B.
 McKeel, C. B.
 McSkimming, D. A.
 MacLennan, D. C.
 MacRoberts, M. V.
 Maddox, H.
 Maloney, L. G.
 Maufrais, C. A.
 Meade, J. B.
 Mee, R. A.
 Merchant, A. I.
 Meredith, J. L.
 Merritt, H. R.
 Messanelle, R. A.
 Milford, J. J.
 Miller, C. F.
 Miller, C. S.
 Miller, H. F.
 Miller, L. E.
 Minnick, T. C.
 Mitchell, C. D.
 Moen, E. I.
 Moll, J. J.
 Mollers, W. P.
 Moore, C. A.
 Moore, C. B.
 Moore, H. B.

- Moore, J. B.
 Moss, R. L.
 Moyer, C. W.
 Mueller, H. O.
 Mulford, W. T. G.
 Mulkern, J. P.
 Mundy, W. H.
 Murphy, D. A.
 Murphy, J. H.
 Murphy, J. H. B.
 Murphy, R. F.
 Myers, J. F.
 Neal, H. L.
 Neely, J. M.
 Nelson, F. A.
 Nelson, F. E.
 Nelson, J. D.
 Nelson, O. W.
 Nelson, W. F.
 Norman, N. L.
 Northrop, L. V.
 Nuttman, K. W.
 O'Brien, L. J.
 Ochampaugh, L. L.
 O'Kelley, C. B. M.
 Olson, C. L.
 Olson, G. E.
 Olson, M. O.
 Ostergrad, R. S.
 Osterheld, R. G.
 Palmer, G. A.
 Palmer, J. L.
 Pariseau, T. A.
 Parker, G. A.
 Paulson, K. G.
 Pedley, M. C.
 Perard, D. J.
 Perkes, C. H.
 Person, E. C.
 Pierce, C. A.
 Pilcher, A. B.
 Pile, P. P.
 Plaisted, K. F.
 Pope, B. J.
 Portelance, A. J.
 Pospichal, P. J.
 Potter, M. F.
 Price, W. W.
 Prime, L. C.
 Quinlan, J. P.
 Quinn, E. J., jr.
 Rainforth, L. R.
 Rankin, J. D.
 Reed, E. B.
 Reynolds, H. B.
 Rich, H. W.
 Rider, E. S.
 Richardson, R. M.
 Roat, R. A.
 Robbins, B. R.
 Roberts, A. L.
 Robinson, B. G.
 Robinson, V. O.
 Rodemich, L. F.
 Rogers, B. F.
 Rogers, J. C.
 Ropes, W. M.
 Rose, J. E.
 Rosencrans, W. G.
 Russell, T. N.
 Sanford, W. A.
 Schall, M. R.
 Schleicher, W. J.
 Schmitt, H. I.
 Scott, H. J.
 Scott, P. B.
 Scripp, J.
 Searcy, P. C.
 Seavey, A. J.
 Sees, W.
 Seitzinger, A. E.
 Semple, C. N.
 Shaffer, S. C.
 Sharp, H. B.
 Sheets, E. M.
 Shephard, W. S.
 Shields, W. S.
 Sibley, E. A.
 Silve, J. F.
 Simmons, J. G.
 Simons, A. T.
 Slagerman, R. A.
 Smart, J. D.
 Smith, A. C.
 Smith, C. L.
 Smith, H. McK.
 Smith, R. B.
 Smith, R. C.
 Smith, W. Z.
 Snell, W. A.
 Somers, T. McC.
 Soucy, L. J.
 Stapp, A. B.
 Stayton, C. H.
 Stevenson, E.
 Stiefel, C.
 Stivers, H. W.
 Stone, N. C.

Strunk, J. B.
 Swain, H. B.
 Swanson, H. C.
 Swope, P. A.
 Tausig, M. R.
 Thames, B. M.
 Thomas, T. V.
 Thompson, E. B.
 Tibbets, F. O.
 Tindall, H.
 Tower, J. Z.
 Tucker, L. L.
 Tunberg, C. G.
 Twohy, J. K.
 Turner, J. W.
 Umphlette, C. L.
 Underwood, H. J.
 Van Arsdall, H. McK.
 Varga, L. N.
 Veazey, F.
 Viele, C. E.
 Vowles, W. F.
 Walsh, J. E.

Walsh, T. J.
 Wass, L.
 Webb, V. B.
 Wehr, A. H.
 Wenker, B. A.
 Wetzel, L. J.
 White, E. S.
 Whitlow, W. D.
 Wiemann, C. A.
 Wieman, C. L.
 Wiggin, P. C.
 Williams, H. J.
 Williams, J. D.
 Williams, W.
 Wilson, T. R.
 Wolf, C. M.
 Woodell, W. C.
 Wooley, R. A.
 Worster, C. B.
 Woznicki, R. V.
 Wright, R. B.
 Zoll, G. C.

EXAMINATION QUESTIONS.

The following set of questions were recently asked by a board of examiners in examining pharmacists (temporary) for the grade of chief pharmacist (temporary), United States Navy.

This set includes several good questions and seems to be a thorough, conscientious, and fair examination into the professional qualifications of the candidate before making recommendation to the Bureau of Medicine and Surgery.

GENERAL EDUCATION.

Answer any five questions; no more, no less.

1. What part does the dust in the air play in nature?
2. What are the different kinds of electricity?
3. What are the natures of the following: Hertzian waves, heat waves, light waves, actinic waves, X-rays, cathode rays?
4. (a) What is the barometer and its uses? (b) What is the psychrometer and its uses?
5. What is Boyle's law and what is Newton's law?
6. Give approximate dates when following men lived: Napoleon Bonaparte, Hannibal, Julius Caesar, Martin Luther.
7. What are the capitals of the following countries: China, India, Brazil, Canada, Spain.

PHARMACY.

Answer each question briefly. When the candidate has answered a question, he will be required to turn that question and answer in before receiving another.

1. (a) What is weight; specific gravity; specific volume?
 (b) What is the weight of 100 mls of mercury having specific gravity 13.5? What is the volume of 100 grams of sulphuric acid having a specific gravity of 1.830?
 (c) What is the length in centimeters of 1 yard? What is the weight in avoirdupois pounds of 10 kilograms? What is the weight in grains of 1.250 grams? What is the weight in milligrams of 66 grains?
 (d) What is a hydrometer; saccharometer; and pyknometer?
2. (a) What is a thermometer? What three temperature scales are used for thermometers? What is the freezing and boiling point in each? Convert -5°C. into $^{\circ}\text{F.}$ Convert 25°F. into $^{\circ}\text{C.}$ Which is used in the United States Pharmacopeia.
 (b) What processes in pharmacy require the application of high heat? Define each.
3. (a) What is precipitation? What is the separated solid termed and what are the objects of precipitation in pharmacy?
 (b) What is dialysis and what are crystalloids and colloids?
 (c) What substances are said to be hygroscopic?
 (d) What are waters; solutions; tinctures; and oleoresins?
4. Sulphur:
 (a) Where does it come from and how is it prepared?
 (b) What is formed by it in combination with hydrogen?
 (c) What combinations does sulphur form with oxygen, and what do these combinations form by their union with water? (Give their formula in symbols.)
 (d) In what forms is sulphur official and how are they prepared?
 (e) What form is used for medicinal purposes and why?
 (f) In what official preparation is sulphur used?
5. Mercury:
 Describe it.
 What two series of compounds does it form?
 Is it used in medicine in the metallic state?
 What is the difference between calomel and bichloride?
6. What is cellulose? What is its formula in symbols?
 Give an example of pure cellulose, official.
 What is pyroxylin? How is it prepared?
7. What are volatile oils and whence are they obtained?
 What other term is applied to these oils?
 Into what four classes may these be divided?
 Give an example of each.
 Enumerate some of the constituents found in volatile oils.
 Mention some synthetical products which are chemically identical with volatile oils.
 Of what two principals do volatile oils proximately consist and how may they be separated?
8. Enumerate the official substances obtained from the animal kingdom.

CHEMISTRY.

1. How are metals distinguished from nonmetals?
 Explain the term allotropic modification.
 Mention some elements capable of existing in allotropic modification.
 Explain the term combustion; combustible substance and supporter of combustion.

Mention some oxidizing agent.

State the difference between amorphous, crystalline, polymorphous, and isomorphous substances.

2. (a) State the law of constancy of composition.
- (b) What is meant by combining weight of the elements?
- (c) If the formula of water is H_2O , how much hydrogen and how much oxygen are required to form 20 parts of water?
- (d) What are acids? Bases? Salts? Acid salts? Normal salts? Double salts?
- (e) Give an example of an oxy-acid and hydracid.
- (f) What are immiscible solvents and how are they used?
3. (a) State the names and general physical properties of the Halogens. How many hydrochloric acid be made? What is aqua regia?
- (b) How many grams of sulphuric acid and sodium nitrate required to make 50 grams of nitric acid?
 $H-1, S-32, O-16, Na-23, N-14.$
- (c) Outline a general test for arsenic.
4. (a) What is organic chemistry? Mention four chief elements entering into organic compounds.
What is meant by empirical and graphic formula?
- (b) What is meant by the expression "open chain" and "closed chain" series? Give an example of each. What do you understand by isomerism, metamerism, and polymerism? Give the graphic formula of an "ortho," "meta," and "para" compound. What is an aldehyde? What is a ketone? What is an ether? What is ethyl ether, and how is it made? Name an official aldehyde, ketone, ether, and alcohol.
- (c) What are the products obtained from petroleum? What is the difference between petroleum "benzin" and "benzene" chemically? Will petroleum products saponify? What is a soap?

HYGIENE AND SANITATION.

1. (a) Give application of Ehrlich's theory to the production of antitoxins and to the production of lysins.
- (b) Define a true toxin and enumerate the three known as such.
- (c) Give methods by which active immunity is acquired.
2. (a) What is meant by mechanical and what by biological transmission of disease by insects and give two examples of each.
- (b) How are the following infections contracted: Hook-worm disease, trichinosis, tapeworm, filariasis?
- (c) What are the diseases in which human bacillus carriers play an important part?
3. (a) What are the quarantinable diseases in maritime quarantine and give period of detention of each.
- (b) What are the points of relative efficiency in liquid disinfectants between solutions and emulsions?
- (c) Define the following as applied to sewage disposal: Grit chamber, plain settling tanks; septic tanks, and Imhoff tank.
4. (a) Discuss meat poisoning.
- (b) How does character of soil affect the sanitary aspects of wells and springs?
- (c) How is vitiated air harmful to man?
- (d) Discuss briefly clothing in its relation to body temperature.

CLERICAL PROCEDURES.

1. (a) What is the clerical procedure upon the discharge of a hospital corpsman from the service?
- (b) Give clerical procedure in case of death of any person attached to hospital.
- (c) Give clerical procedure upon the admission and transfer of an officer from hospital (sick list) to duty.
 - (c-1) Admission of a patient with a disease not in line of duty, due to his own misconduct.
 - (c-2) Admission of pensioner. Clerical procedure necessary in effecting the reversion of pension money to naval hospital fund.
2. (a) What navigation returns are required from a naval hospital?
- (b) What is the disposition of service record of a man who is declared a deserter from a naval hospital?
- (c) What entries should be made in service record of a man who is discharged dead?
3. (a) Give a brief outline of Supply Table United States Navy (Medical Department).
- (b) How are microscopes and typewriters procured?
- (c) What is the disposition of Medical Department stores when a ship is placed out of commission?
- (d) Outline preparation, when and where forwarded, of M. & S. returns and Forms F, H, K, L, M, N, P, B, Ba, and 4.
4. (a) For what is N. M. S. Requisition Form 1 used?
- (b) How is it prepared, and what points must be carefully gone over?
- (c) Route this form from naval hospital to bureau or bureaus concerned and return.
- (d) What is the ultimate disposition of the original?
- (e) Approximate number of copies made.
- (f) What other form or forms are required if this form is approved and completed, and how are they prepared? What points must be carefully gone over in the preparation of these forms? How are these forms numbered?
- (g) What is a stub requisition? What substances may be procured on stub requisition? How are these requisitions numbered?
- (h) How are Form B open-purchase requisitions and stubs entered on bill book?
- (i) What constitutes a voucher; to be entered in bill book; when vaccine virus is received; articles received on Form Ba; commissary stores received on requisition from supply officer?

ADMINISTRATION.

1. You have been detailed as the chief pharmacist to a naval hospital which has recently been built. This hospital has in it all the necessary plumbing and permanent fixtures, which, of necessity, are let in the contract for building. The Bureau of Medicine and Surgery notified the commanding officer of the hospital that it will be necessary to receive 500 patients six months from date. In answering this question it is not desired that you submit any forms in reference to commissioning hospital. You are dealing mainly with the establishing of a hospital which has been commissioned, and you have pharmacists on duty under your direction.

QUESTIONS.

1. Name the departments that you would establish and outline a plan of conducting each. Give the number and rating of hospital corpsmen you would ask to be detailed to this hospital and how would you distribute them?
2. In what departments of a hospital would you require civilian help, and how may these be obtained and how discharged?
3. Issue regulations covering baggage room.
4. Issue regulations covering ambulance service.

COMMISSARY.

1. (a) Enumerate sources from which you are authorized to obtain provisions.
(b) Tell briefly how to obtain provisions from each source.
2. (a) What information does the ration memorandum give?
(b) What are the uses of the commissary ledger?
(c) How is the average cost per diem of subsistence obtained?
(d) How is the average cost per diem of maintenance obtained?
3. (a) What diseases may result from a monotonous and restricted diet?
(b) What are the characteristics of the protein legumin which influence method of cooking articles whose protein content is made up largely of that form of protein?
(c) What are the approximate food values in chestnuts, Swiss cheese, walnuts?
4. Using all or part of the following articles with which to prepare a well-balanced dinner, make out menu for a meal containing approximately 1,500 calories, using food values as nearly accurate as your memory will allow. Show calculations made and results arrived at: Moderately lean beef, sugar, fresh eggs, evaporated milk, potatoes, rice, string beans, coffee, bread, salt, pepper, butter.

FIRST AID AND MINOR SURGERY.

1. (a) Give symptoms and first-aid treatment of shock.
(b) Give various degrees of burns and treatment.
(c) Give instances of anaerobic septic organism.
2. (a) Give mechanism by which carbon monoxide is poisonous and give first-aid treatment for carbon monoxide poisoning.
(b) Give the symptoms and first-aid treatment of acute appendicitis.
(c) Give symptoms and first-aid treatment of fracture of base of skull.
3. (a) Give first-aid treatment of bite by mad dog.
(b) Give first-aid treatment of hemorrhage from a gastric ulcer.
(c) Give first-aid treatment of suffocation due to aspirated food particle.
4. A man is brought to you unconscious. What might be the cause of the unconsciousness and how would you proceed to examine him in the absence of any history of the case?

ANATOMY AND PHYSIOLOGY.

1. (a) Define protoplasm, nucleus, cilia, epithelial tissue, metabolism.
(b) Describe the bony chest.
(c) Describe the knee joint.
(d) Give the structure of a small artery; locate the following: Brachial artery, superficial temporal artery, posterior tibial artery, external jugular vein, thoracic duct.

- (e) Explain anatomically the possible symptoms following a depressed fracture over the right ear; a compound fracture of the tenth thoracic vertebra; ligation of the left common carotid artery. Explain anatomically asthma and intestinal colic.
2. (a) Describe briefly the structure of the lungs and explain the aeration of the blood.
- (b) What is the difference between inspired and expired air?
- (c) Explain the act of respiration.
- (d) Define tidal air, vital capacity, and tell how many cubic feet of air are needed per hour by a man not at work.
- (e) Define pleura, pericardium, dura mater, Bowman's capsule, mesentery.
3. Give the digestion, absorption, and elimination of a slice of toast and a glass of milk.
4. (a) Name the parts of the eye from before backward and explain the physiology of sight.
- (b) Locate the pancreas and give its function.
- (c) Describe briefly and give functions of the kidneys.
- (d) Locate the prostate.
- (e) What is the spleen?

MATERIA MEDICA.

1. (a) What are glucosides and classify the official glucosidal drugs in accordance with their physiological action.
- (b) Name the glucosidal drugs containing nitrogen. Are they poisonous? If so, why?
2. (a) What are gum resins?
- (b) Name the gum resin drugs official.
- (c) Give their action and uses.
- (d) How should these drugs be administered?
- (e) Give incompatibilities.
3. (a) Caffeine: Define. From what plant or plants is this drug obtained? Give the approximate percentage of caffeine in each. Give action, doses, and uses of this drug.
- (b) Belladonna: What part or parts of the plant is used? What alkaloids are obtained from this family? Name the official drugs of this family and give their action and uses.
4. (a) Name the drugs classified as vermifuges. Give in detail the administration of this class of drugs.
- (b) What drug is used for treatment of hookworm, and how should it be administered?
- (c) What is the most important drug used for tapeworm? Define this drug. Give method of administration; dose.

TOXICOLOGY.

1. (a) What is toxicology; posology; define a poison.
- (b) Give general symptoms and treatment of poisons by mineral acids and alkalies.
- (c) Name four neurotic poisons.
- (d) Name three general antidotes for alkaloids which may be administered internally.

2. Give the symptoms and treatment of lead poisoning. With what other conditions may this be confounded? Under what conditions is lead poisoning generally contracted, and how may this be prevented?
3. (a) What are the symptoms of poisoning by bichloride? By wood alcohol? Thymol? Acetanilid?
(b) Treat each case.
4. (a) You are given a sample of creosote to determine if coal-tar creosote is present. How would you proceed?
(b) What are the symptoms of phenol poisoning? Give treatment.

The following certificate, signed by the candidate, should accompany the papers:

I certify that I have not received aid from any unauthorized source in answering the questions of this examination.

(Candidate's signature.)

CORRESPONDENCE COURSE FOR NAVAL PHARMACISTS.

PAPER No. 10.

PROBLEM.

All fixtures, equipment, etc., have been installed in the dispensary of a new naval hospital with a capacity for 500 patients.

It is now your duty to fully stock this dispensary with supplies for six months.

Give names and quantities of all items desired, arranging items in groups according to the requisition to be used (Form B, stub and open purchase). Arrange the items in the order in which they should appear on each of the various requisition forms used.

ANSWER TO QUESTION NO. 10.

Preparation of the answer to this question has been difficult. In endeavoring to formulate a proper answer the director of the course has consulted those submitted by many of the participants—men of long and practical service in the Navy—and has endeavored to correlate various outstanding points mentioned in their papers, and thus to construct an answer which will be of assistance to us all.

The wording of the question is unfortunate because it does not parallel conditions that would exist other than in theory. If a requisition Form B were actually submitted to cover the commissioning of a new hospital, the pharmacist would, of course, include a complete outfit of every sort of stores, and it is noted that in a large proportion of the answers received this actually has been done; in addition to the stores required to run the dispensary for six months requisi-

tion has been made for bedding and linen, surgical instruments, dental outfits, books, etc. This is wrong, as is obvious from the wording of the question. You are required to fully stock the dispensary, not the entire hospital. You do not issue books and surgical instruments, bedding, linen, hot-water bags and fountain syringes, dental supplies, X-ray chemicals, etc., from the dispensary. To be sure, they are issued through the dispensary, because the pharmacist makes requisition for them all; all are kept in the same storeroom, and the chief pharmacist's mate in charge of the dispensary is usually the property man who has general charge of all supplies under the pharmacist. If the cost of maintenance of each department of the hospital were kept separate, the cost of hot-water bags and nursing supplies would be charged not to the dispensary, but to the wards; books would be charged to the executive department; instruments, sutures, and dressings to the surgical department; photographic plates and chemicals with which to make developing solutions would be charged to the X-ray department, etc. Certain articles of general hospital supplies listed under special headings (as, for instance, wooden tongue depressors and applicator sticks under "Nursing and hospital appliances") are properly considered as dispensary supplies, although they are not used in the dispensary to fill prescriptions or to carry on the activities of the dispensary department.

Many participants in the course have lost sight of the fact that this question calls for the original stocking of the dispensary of a new hospital. Many have described emergency purchases and requisitions made to cover the needs of epidemic conditions. According to the reading of the question, there is nothing to indicate that an emergency exists, and all the supplies necessary for the original stock can readily be anticipated, except, perhaps, certain articles which will be procured on requisition Form 1.

The new Supply Table recently issued by the Bureau of Medicine and Surgery will be found to meet practically all requirements for care of the sick in our naval hospitals, and few, if any, drugs not listed on the Supply Table would be necessary were it not for the fact that such hospitals have a most varied clientèle besides the regular Navy sick. Among their patients will be found retired officers and enlisted men of the Navy and Marine Corps, members of the Female Nurse Corps, civilian employees, mechanics from navy yards, etc. Due to this condition, the prescribing of semi-patent and proprietary remedies has to a certain extent taken hold upon medical officers in the service. To minimize the evil of prescribing such remedies the National Formulary has been given semiofficial recognition. For this reason it is quite necessary that the original dispensary stores shall contain certain articles with which to manufacture National Formu-

lary preparations. It is directly contrary to the policy of the Bureau of Medicine and Surgery to supply a great number of these articles, because it is believed that the present Supply Table covers all essential remedies. Reference to the answers submitted by the participants in the course reveals a great diversity of opinion as to which of these extracts, lozenges, compressed tablets, etc., are needed. It is obvious that the individual medical officers attached to hospitals will govern the requirements of that hospital in this request, and for that reason the director of the course has decided not to introduce any list of such articles.

However, if reference is made to the answer to question No. 9 sent out from this office, it will be found that in the allowance of containers which has been made as part of the equipment of the dispensary there are certain ones which will suggest the most frequently called for remedies not listed on the Supply Table. Form 1 may be submitted to the bureau for such articles.

Regarding the quantities required of the various items, it is found that the answers of some of the most experienced of our pharmacists differ widely in accordance with their individual experience and the practice of the hospitals to which they have been attached. For this reason the director of the course has taken the average of ten answers in this respect and has introduced those figures into the sample requisitions given below.

Another point that has been overlooked by many members of the class in the reading of the question is the matter of equipment already provided for in the answer to question No. 9. Graduates, funnels, spatulas, percolators, etc., have been asked for in the answer to question No. 10, whereas the question specifically states that all fixtures, equipment, etc., have been installed (in accordance with the answer to question No. 9). In the lists given below these items have been eliminated.

The original outfit will be obtained on four forms of requisition, viz: Form B, Form 1, letter form to the Bureau of Medicine and Surgery, and stub requisition on the supply officer of the nearest navy yard. The articles covered by each form are indicated below. When ordering drugs on Form 1, it is often well to use the common English names rather than the proper pharmaceutical appellations, because it frequently happens that the shipping clerks in drug houses handle a majority of their orders by the common names. If the pharmacist at a hospital will obtain from the supply officer at the nearest navy yard a "stowing list" of the various storehouses under his charge, articles asked for on stub requisitions often can be so grouped that all those covered by one requisition will be found in one

storehouse, thus meeting the convenience of the supply department and facilitating delivery of the stores.

Although the proper making of a requisition does not enter into the scope of this question and answer, I desire at this time to add a word concerning that matter.

You, pharmacists that are and that are to be, are responsible for the proper construction of every requisition which emanates from the medical department of the hospital, dispensary, ship, or station to which you are assigned for duty. Commanding and executive officers depend upon you to put these papers in proper order before presenting them for signature. After going over the items and quantities, and the general form and wording of the requisitions, they are prone to accept the assurance of the pharmacist that everything is in proper form, all copies alike, headings and subheadings correct, etc., and you doubtless believe your assurance to be reliable. But it is a fact that practically no day passes on which the Bureau of Medicine and Surgery fails to receive for approval, requisitions improperly composed in every conceivable way.

There is no excuse for this state of affairs. Instructions regarding the proper making of requisitions are plentiful and explicit—in the Supply Table, in the Manual for the Medical Department, in the Hospital Corps Handy Book, in the Hospital Corps Supplement to the Bulletin. It is your duty to study them to the point of perfect knowledge. If a hospital corpsman makes out the reports and returns under your orders, and says they are correct, do not accept his word for it until you have proved it by carefully going over the work yourself. Years of experience as a medical officer in the Navy have shown me that the word of very few can be accepted as to the correctness of a paper—sometimes not even the word of the pharmacist. This knowledge entails the expenditure, by medical officers, of hours of labor that might be spent on other matters, if confidence in the ability and carefulness of the pharmacist were not so often destroyed by the bureau's return, for corrections, of requisitions and reports.

The present director of this course is also president of the board for the examination of candidates for appointment as permanent pharmacists. The questions for this examination have been prepared and are believed to be absolutely fair, being based upon what should be the knowledge of every hospital corpsman qualified by law to take the examination. Hospital administration has a prominent place in this test; and because instructions are so fully set forth in the various publications of the Medical Department, great accuracy in the details of the answers to the questions will be demanded by the board to entitle the candidate to a passing mark.

ARTICLES REQUESTED ON FORM B.

Note.—These quantities are for the units given in the supply table and are based on an average of 10 sample requisitions submitted by participants in this course, and are not to be regarded as fixed allowances. In making requisitions for large amounts of stores, due regard always should be paid to ordering multiples of the number of packages contained in an original carton. This is of assistance to the supply depot.

Hospital stores (p. 10, Form B).—It is well to order the original supply from the supply depot, although most of the items may be obtained from the commissary department of the hospital. The items under this heading in the supply table are really intended for supply to ships. It is customary, however, to have them in store at naval hospitals.

Antiseptics and disinfectants (p. 8, Form B).—A remark similar to the above applies here also. The supply officer of the navy yard keeps some of them on hand, and stubs may be made to meet requirements. The original supply, however, should come from the supply depot.

Surgical dressings (pp. 13 and 14, Form B).—These articles have been inserted as part of the dispensary supplies because they are of general use in all departments of the hospital. It is difficult to draw the line between those items which should or should not be considered as dispensary supplies.

Dispensary and laboratory equipment (pp. 15, 16, and 17, Form B).—Articles not embraced below have been provided for in the answer to question No. 9.

Hospital and nursing appliances (pp. 17, 18, and 19, Form B).—The above remark upon surgical dressings also applies to this class of stores.

Stationery.—As stationery is used throughout the entire hospital, and as no other department of the hospital is as well fitted to handle it, the entire hospital supply of stationery has been inserted as forming part of dispensary supplies.

REQUISITION AND PRICED INVOICE FORM B BASED ON SUPPLY TABLE 1918.

| Drugs: | Quantity. | Drugs—Continued. | Quantity. |
|-----------------------------|-----------|---------------------------|-----------|
| Acacia | 40 | Acidum phenylcinchonini- | |
| Acetanilidum | 25 | cum | 15 |
| Acetphenetidinum | 45 | Acidum salicylicum | 20 |
| Acidum aceticum glaciale .. | 10 | Acidum sulphuricum | 15 |
| Acidum acetylsalicylicum .. | 80 | Acidum sulphuricum aroma- | |
| Acidum boricum | 80 | ticum | 10 |
| Acidum citricum | 15 | Acidum tannicum | 20 |
| Acidum hydrochloricum | 20 | Acidum tartaricum | 35 |
| Acidum nitricum | 15 | Adeps benzoïnatus | 115 |

Drugs—Continued.

Quantity.

| | |
|---------------------------------|-----|
| Adeps lanae hydrosus | 50 |
| Adrenalini hydrochloridum | 35 |
| Aether (for anaesthesia) | 900 |
| Aetheris nitrosi, spiritus | 75 |
| Aethylis chloridum | 65 |
| Alcohol dehydratum | 10 |
| Alcohol methylicum | 10 |
| Alumen (powdered) | 15 |
| Ammoniae, spiritus aromaticus | 55 |
| Ammonii carbonas | 25 |
| Ammonii chloridum | 35 |
| Amylis nitrus | 10 |
| Antimonii et potassii tartras | 10 |
| Antipyrina | 20 |
| Argenti nitras | 30 |
| Argenti nitras fusus | 10 |
| Argentum colloidal | 150 |
| Argentum proteinicum | 125 |
| Arsphenamine | 250 |
| Aurantii, spiritus compositus | 25 |
| Balsamum Peruvianum | 15 |
| Belladonnae, emplastrum | 20 |
| Belladonnae foliorum, extractum | 10 |
| Benzoinae, tinctura composita | 20 |
| Bismuthi subgallas | 15 |
| Bismuthi subnitras | 45 |
| Buchu, fluidextractum | 10 |
| Caffeina citrata | 15 |
| Camphora | 35 |
| Capsici, emplastrum | 15 |
| Capsici, tinctura | 10 |
| Cardamomi, tinctura composita | 15 |
| Caryophylli, oleum | 10 |
| Cataplasma kaolini | 45 |
| Cera alba | 25 |
| Chloralum hydratum | 15 |
| Chlorine-antiseptic compound | 75 |
| Chloroformum (anaesthesia) | 125 |
| Cinchonae, tinctura composita | 15 |
| Cocainae hydrochloridum | 35 |
| Codeinae sulphas | 25 |
| Collodium cantharidatum | 10 |
| Collodium flexile | 125 |

Drugs—Continued.

Quantity.

| | |
|--------------------------------|-----|
| Creosoti carbonas | 50 |
| Creosotum | 20 |
| Creta praeparata | 20 |
| Cupri sulphas | 10 |
| Diacetylmorphinae hcl | 20 |
| Digitalis, tinctura | 15 |
| Ergotae, fluidextractum | 10 |
| Eucalyptol | 15 |
| Ferri chloridi tinctura | 20 |
| Ferri citro-chloridi, tinct. | 25 |
| Ferri pyrophosphas solubilis | 10 |
| Gentianae, tinctura composita | 25 |
| Glycerinum | 70 |
| Glycyrrhizae, extractum purum | 45 |
| Glycyrrhizae, pulvis comp. | 25 |
| Gossypii seminis, oleum | 70 |
| Guaiacol | 20 |
| Hexamethylenamina | 100 |
| Homatropinae hydrobromidum | 20 |
| Hydrargyri chloridum cors. | 55 |
| Hydrargyri chloridum mite. | 75 |
| Hydrargyri, massa | 10 |
| Hydrargyri nitratis, unguentum | 10 |
| Hydrargyri, oleatum | 10 |
| Hydrargyri oxidum flavum | 15 |
| Hydrargyri salicylas | 20 |
| Hydrargyri, unguentum | 55 |
| Hydrargyrum ammoniatum | 20 |
| Hydrogenii dioxid, liquor | 115 |
| Hyoscyami, fluidextractum | 10 |
| Hypophysis, liquor | 20 |
| Iodoformum | 25 |
| Iodum | 90 |
| Ipecacuanhae et opii, pulvis | 15 |
| Ipecacuanhae, fluidextractum | 10 |
| Ipecacuanha | 15 |
| Lithii citras | 15 |
| Magnesii carbonas | 30 |
| Magnesii sulphas | 120 |
| Menthae piperitae, oleum | 15 |
| Menthol | 25 |
| Methylis salicylas | 40 |
| Morphinae sulphas | 15 |
| Morrhuae, oleum | 40 |
| Myrrhae, tinctura | 15 |
| Nucis vomicae, tinctura | 20 |
| Opil pulvis | 10 |

| Drugs—Continued. | Quantity. | Drugs—Continued. | Quantity. |
|------------------------------------|-----------|-----------------------------------|-----------|
| Opil, tinctura | 20 | Terebenum | 15 |
| Opil, tinctura camphorata | 55 | Terebinthinae, oleum | 35 |
| Paraffin-wax | 50 | Terpini hydras | 30 |
| Pepsinum | 20 | Theobromatis, oleum | 35 |
| Petrolatum | 90 | Thymol | 15 |
| Petrolatum liquidum | 120 | Thymolis iodidum | 30 |
| Phenylis salicylas | 25 | Trinitrophenol | 35 |
| Physostigminae sulphas | 15 | Zinci oxidum | 40 |
| Picis liquidae rectificatum, oleum | 20 | Zinci sulphas | 15 |
| Plumbi acetat | 25 | Zingiberis, fluidextractum | 15 |
| Potassii acetat | 20 | Antiseptics and disinfectants: | |
| Potassii arsenitis, liquor | 15 | Drugs— | |
| Potassii bicarbonas | 30 | Barii dioxidum | 150 |
| Potassii bitartras | 20 | Calx chlorinata | 200 |
| Potassii bromidum | 20 | Cresol | 150 |
| Potassii chloras | 30 | Formaldehydi, liquor | 250 |
| Potassii et sodii tartras | 70 | Hydrargyri chlor. cor- | |
| Potassii hydroxidum | 30 | ros., toxitab | 95 |
| Potassii iodidum | 35 | Phenol | 125 |
| Potassii permanganas | 25 | Potassii hydrargyro- | |
| Procaline | 60 | iodi., toxitab | 95 |
| Pruni Virginianae, fluidextrac- | | Sulphur | 110 |
| tum | 20 | Tablets— | |
| Quininae chlorhydrosulphas | 30 | Acetanilidum | 30 |
| Quininae hydrochloridum | 30 | Acetphenetidinum | 35 |
| Quininae sulphas | 140 | Alkal. et antisept | 35 |
| Resorcinol | 15 | Ammonii chlor | 35 |
| Ricini, oleum | 110 | Barbital | 20 |
| Santal, oleum | 25 | Caffeina citrata | 15 |
| Sapo | 90 | Camph. quin. morph. | |
| Sapo mollis | 60 | atropin sulph | 85 |
| Saponis, linimentum | 100 | Capsici | 15 |
| Sinapis, emplastrum | 30 | Cascara Sagrada | 70 |
| Sodii benzoas | 20 | Cathartic. vegetabil | 75 |
| Sodii bicarbonas | 60 | Chlorodyne | 10 |
| Sodii boras | 35 | Codeina | 30 |
| Sodii bromidum | 15 | D i a c e t y l m o r p h i n a e | |
| Sodii carbonas monohydratus | 85 | hydro | 20 |
| Sodii chloridum | 30 | Elaeterinum | 5 |
| Sodii citras | 20 | Ferrum, quin. sulph., | |
| Sodii hydroxidum | 20 | arseni triox., strych. | 20 |
| Sodii phosphas | 40 | Ferri. chlor., arsen. | |
| Sodii salicylas | 35 | quin. mur., hydrarg | 20 |
| Sodii thiosulphas | 20 | Glycyrrh | 40 |
| Spiritus frumenti | 90 | Hydrarg. chlor. mit | 25 |
| Strophanthi, tinctura | 10 | Hydrarg. chlor. mit | 35 |
| Strychninae sulphas | 10 | Hg. chlor. mit., ipecac. | |
| Sulphonated oil | 55 | sodii bicarb | 25 |
| Sulphonethylmethanum | 20 | Hydrarg. iodid. flav | 45 |
| Sulphur sublimatum | 35 | Ipecac. et opil, pulv | 30 |
| Talcum purificatum | 30 | Laxativae compositae | 35 |

Antiseptics and disinfectants—Con.

Tablets—Continued.

Quantity.

| | |
|-----------------------------|----|
| Opium, plumbi acetat. | 40 |
| Peptonizing tablets | 35 |
| Phenylis salicylas | 30 |
| Podophylli, resina | 10 |
| Potass. chlor., sodii boras | 20 |
| Quininae sulph | 60 |
| Saline transfusion | 55 |
| Santoninum | 10 |
| Sodii bicarb | 40 |
| Sodii salicylas | 40 |
| Sulphonethylmethanum | 20 |

Hypodermic tablets:

| | |
|----------------------------|----|
| Apomorphinae hydrochlor | 15 |
| Atropinae sulph | 40 |
| Caffeinae sodio-benzoas | 20 |
| Cocaina hydrochlor | 25 |
| Digitalin | 30 |
| Emetinae hydrochlor | 50 |
| Glycerilis nitras | 20 |
| Hydrargyri succinimidum | 45 |
| Morphinae sulphas | 45 |
| Morphinae sulph | 45 |
| Morphinae sulph | 65 |
| Physostigminae sulphas | 15 |
| Pilocarpinae hydrochlor | 15 |
| Quininae chlorhydrosulph | 30 |
| Scopolaminae hydrobromidum | 15 |
| Strychninae sulphas | 25 |
| Strychninae sulphas | 35 |

Hospital stores (diet):

| | |
|-------------------------|-----|
| Beef, liquid extract of | 120 |
| Cocoa | 130 |
| Cornstarch | 20 |
| Milk, evaporated | 200 |
| Milk, malted | 200 |
| Soups, assorted | 400 |
| Sugar, white | 50 |

Surgical instruments and appliances

None.

Surgical dressings, etc.:

| | |
|----------------------------------|-----|
| Bandage, suspensory | 240 |
| Paper, impervious, for wet dress | 50 |
| Pins, assorted | 100 |
| Pins, safety, three sizes | 140 |
| Pouch, Hospital Corps | 2 |
| Shade, eye | 35 |
| Splint set | 40 |
| Tape, adrenalin | 20 |

Dispensary and laboratory equipment and miscellaneous: Apparatus support three rings

| | |
|-----------------------------------|------|
| Beaker, 120 mls | 2 |
| Beaker, 250 mls | 6 |
| Beaker, 300 mls | 6 |
| Beaker, 350 mls | 6 |
| Bottles, 25, 50, 100, and 200 mls | 6 |
| Bottles, blue glass, 200 mls | 95 |
| Box, ointment | 100 |
| Box, pill | 50 |
| Box, powder | 85 |
| Brush, test tube | 65 |
| Can opener | 6 |
| Capsule, gelatin | 2 |
| Clock, small | 60 |
| Clocks, assorted | 30 |
| Corks, for 500 mls bottles | 10 |
| Cork borers | 3 |
| Cork extracter | 1 |
| Cork presser | 2 |
| Corkscrew | 1 |
| Cylinder, graduated | 6 |
| Envelope, drug | 3 |
| Flask, Erlenmeyer | 2000 |
| Flask, Erlenmeyer | 5 |
| Lamp, alcohol, metal | 5 |
| Medicine dropper | 4 |
| Paper, filtering | 500 |
| Paper, filtering | 20 |
| Paper, filtering | 20 |
| Paper, wrapping, blue | 20 |
| Paper, writing, white | 40 |
| Pencil, hair | 50 |
| Pot ointment, glass | 150 |
| Scissors, 6-inch | 500 |
| Test tube | 4 |
| Test-tube rack | 100 |
| Tubing, glass | 2 |
| Tubing, rubber | 4 |
| Tubing, rubber | 10 |
| Twine | 10 |
| Hospital and nursing appliances: | 20 |
| Applicator, wood | 25 |
| Bath, eye | 15 |
| Cup, sputum, paper | 200 |
| Medicine glass | 300 |
| Pinchcock | 6 |
| Spectacles, amber glass | 40 |

| Hospital and nursing appliances—Continued. | Quantity. |
|--|-----------|
| Spectacles smoked glass | 40 |
| Thermometer, clinical | 200 |
| Tongue depressor, wood | 15 |
| Books: | |
| Chemistry | 1 |
| Dictionary, medical | 1 |
| Dispensatory | 1 |
| Food Inspection and Analysis | 1 |
| Handy Book, Hospital Corps, United States Navy | 4 |
| Manual for the Medical Department | 1 |
| National Formulary | 1 |
| Pharmacopoeia, United States | 1 |
| Pharmacy | 1 |
| Stationery: | |
| Book, blank, foolscap | 48 |
| Book, blank, small | 48 |
| Carbon sheets | 40 |
| Envelope, official | 3000 |
| Eraser, rubber | 24 |

| Stationery—Continued. | Quantity. |
|-----------------------------------|-----------|
| File, letter | 6 |
| Ink, black | 6 |
| Ink, red | 4 |
| Inkstand | 12 |
| Journal of the Medical Department | 2 |
| Labels, box (round) | 25 |
| Labels, bottle | 25 |
| Labels, poison, bottle | 10 |
| Pad, memo | 500 |
| Pad, prescription | 200 |
| Paper, blotting | 10 |
| Paper clip | 48 |
| Paper fastener | 100 |
| Paper, official, green | 200 |
| Paper, official, white | 400 |
| Paste, library | 6 |
| Pencil, lead | 200 |
| Penholder | 50 |
| Pen, steel | 6 |
| Rubber band | 50 |
| Ribbon, typewriter | 24 |
| Ruler | 12 |
| Shears, desk | 12 |

ARTICLES REQUIRED FOR ON FORM 1.

All those referred to above as necessary for the manufacture of national formulary preparations, and such other drugs and medicines, as in the judgment of the commanding officer of the hospital, may be needed to properly care for the patients treated.

REQUESTED BY LETTER FORM FROM THE BUREAU OF MEDICINE AND SURGERY.

| | | |
|------------------------|--------|--------|
| Cowpox vaccine | points | 1,000 |
| Antityphoid vaccine | mils | 1,000 |
| Antidiphtheritic serum | units | 15,000 |
| Antimeningitis serum | do | 15,000 |

(See Manual for Medical Department, par. 3661 et seq.)

ARTICLES OBTAINED FROM THE NAVY-YARD SUPPLY OFFICER ON STUB REQUISITIONS.

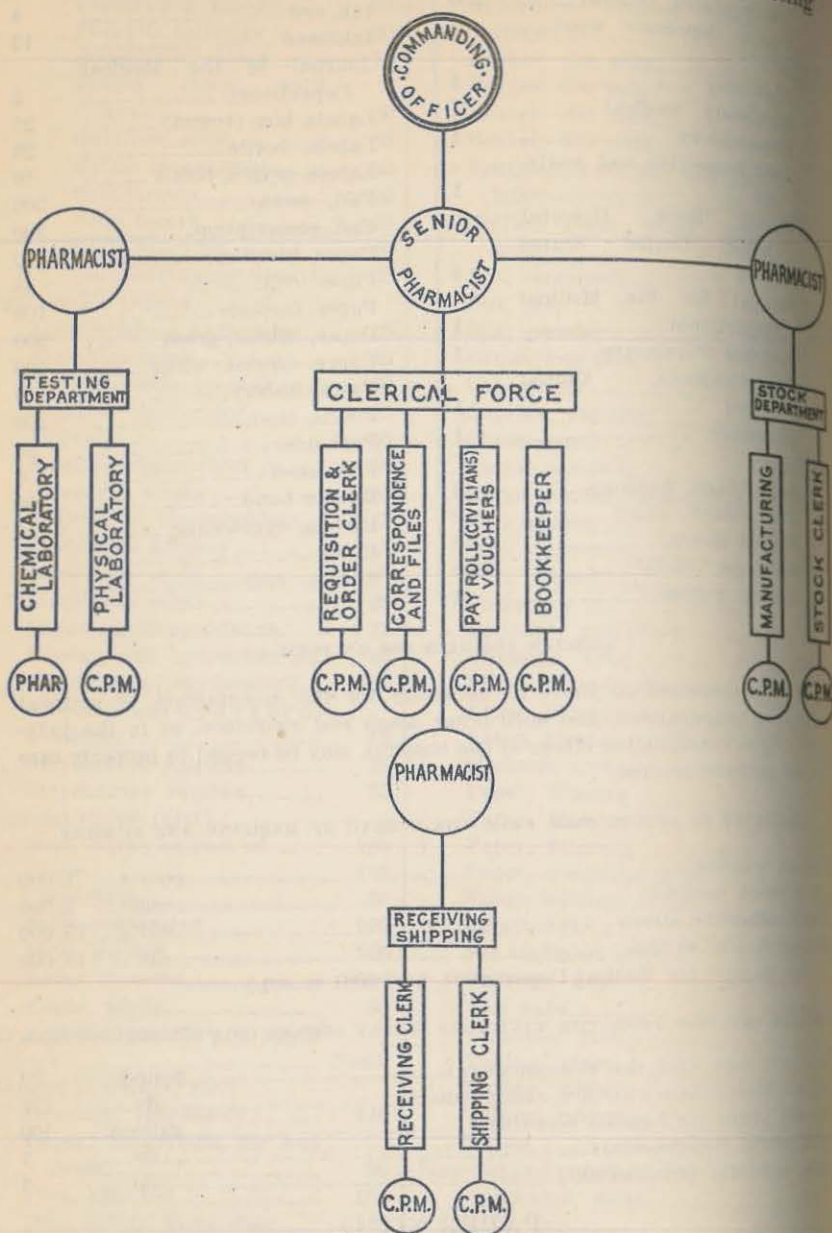
| | | |
|---|---------|-----|
| Sulphuric acid (for fire extinguishers) | pounds | 20 |
| Sodium bicarbonate (for fire extinguishers) | do | 125 |
| Alcohol, grain (in 5-gallon containers) | gallons | 100 |
| Acid, nitric (commercial) | do | 1 |
| Acid, muriatic (commercial) | do | 1 |

PAPER NO. 12.

PROBLEM.

A new naval medical supply depot which is to constitute a source of supplies for the entire Navy is about to be commissioned. The

commanding officer has designated you, as senior pharmacist, to act in an executive capacity. You are expected to assist in effecting



organization of personnel and to arrange for procurement of a stock of supplies with which to fill requisitions.

(a) Outline (in writing or by diagram) your scheme of organization, showing departments you would create and indicating the

capacities in which you would utilize pharmacists and chief pharmacist's mates, respectively.

(b) Describe briefly how the depot would proceed to acquire its initial stock of supplies and blank forms with which to fill requisitions.

(c) Show every step involved in the procurement of supplies by purchase through the local supply officer from the time a request for purchase is submitted by the depot until delivery is effected by the contractor.

(d) Outline a system of bookkeeping whereby you would be enabled to account financially for stock issued on requisitions and at the same time be enabled to determine how much stock you had on hand at any time without recourse to inventory.

ANSWER TO QUESTION NO. 12.

FIRST PAPER ON SUPPLY-DEPOT WORK.

The work with which the naval personnel of a medical supply depot is intrusted consists essentially of clerical work, testing supplies, filling requisitions, and movement (receipt and shipment) of supplies. A separate department should be created to take care of each of these four classes of work. We would then have an organization similar to the one shown in the accompanying diagram.

With reference to the diagram, the duties of the personnel may be summarized as follows:

ANSWER TO (A).

Clerical force.—The senior pharmacist acts in an executive capacity, and particularly directs the work of the clerical force in the acquisition of supplies, the preparation of correspondence and vouchers, and the bookkeeping in a manner satisfactory to and in accordance with the orders of the commanding officer.

The requisition and order clerk prepares requests for purchase, addressed to the local supply officer and based on approved supply-depot requisitions; orders to contractors for supplies obtainable at stated periods in accordance with the terms of contracts already in force; and requisitions (Form 1), on the Bureau of Medicine and Surgery, on which to base future requests for purchase. He also keeps a record showing dates on which contractors have obligated themselves to deliver supplies and reports all contractors failing to make delivery within the time specified in their contract, in order that the commanding officer of the depot may take proper steps in regard to such delinquency. During the recent national emergency it was also incumbent upon the requisition and order clerk to supply

data relating to supplies contracted for to the statistician of the War Munitions Committee, Council of National Defense.

Correspondence, pay roll of civil establishment, and vouchers are prepared in accordance with Navy Regulations and Instructions, as at all other stations.

The bookkeeper keeps an itemized account showing the amount and value of supplies received, and likewise supplies issued by the depot, and at the end of each quarter prepares Form V (quarterly return of medical stores), which the commanding officer audits and forwards to the Bureau of Medicine and Surgery.

Testing department.—The pharmacist in charge of the testing department directs the work of the chemical and physical laboratories; formulates specifications on which to base purchase of supplies; inspects certain supplies in the process of manufacture; investigates new products and appliances submitted to the depot, and reports in writing to the commanding officer of the depot the results of all inspections, analyses, and tests conducted by the testing department.

The pharmacist in the chemical laboratory examines, chemically, all drugs and preparations purchased for the depot to ascertain compliance with pharmacopœial or other prescribed standards, conducts chemical tests on enamel ware, fabrics, and other supplies required by specifications to meet prescribed chemical test, and conducts chemical investigations to establish standards on which to base specifications.

The chief pharmacist's mate in the physical laboratory applies physical tests to rubber goods, fabrics, ligatures, etc.; calibrates instruments of precision (sphygmomanometers, thermometers, etc.), and examines certain other supplies to ascertain compliance with specifications or conformity to samples submitted with bids, in regard to material, dimensions, and design.

Certain supplies, notably surgical instruments and appliances, are both inspected by the commanding officer and tested by the testing department.

Stock department.—The pharmacist in charge of the stock department checks all supplies received and issued by his department, supervises the filling of requisitions and Forms O, directs the work of the manufacturing division, and safeguards and accounts for the stock of the depot.

The chief pharmacist's mate in the manufacturing division prepares certain galenicals for special units and supervises the assembling and packing of medicine chests, boat boxes, regimental outfits, field outfits, and other units designed for detached or expeditionary duty.

The stock clerk keeps a book (or card-index system) showing amount of supplies actually on hand. By using one or more pages of his book for each item carried in stock and making additions to or deductions from the amounts shown on the book as supplies are re-

ceived or issued, he would at all times have a balance under each item showing amount on hand. The stock clerk would verify his book by continuous inventory, i. e., by taking, in order, inventory of a convenient number of items each day.

Receiving and shipping department.—The pharmacist in charge of this department would see that all supplies received were inspected by the commanding officer or passed by the testing department before transferring them to the stock department; direct shipments with a view to economy and expedition; comply with the Interstate Commerce Commission regulations in shipping explosives, acids, and combustibles; and prepare data for the Director of Inland Traffic of the Navy Department to enable that official to expedite transportation of urgent supplies consigned to or shipped from the supply depot.

The receiving clerk records and receipts for all samples and supplies delivered to the supply depot. He sends a specimen of each item delivered to the testing department, and when the supplies have been passed by inspection or by test he transfers them to the stock department and obtains a receipt from the pharmacist in charge of that department.

The shipping clerk prepares bills of lading and ships supplies as directed by the pharmacist in charge.

ANSWER TO (B).

In order to enable the local supply officer and the Bureau of Supplies and Accounts to make purchases for the supply depot, funds must be made available for this purpose. To this end the medical supply depot would submit requisitions (Form 1) to the Bureau of Medicine and Surgery showing estimated cost for each of the general classes of supplies (medicines, surgical instruments, etc.) required for issue to ships and stations on approved requisitions during the fiscal year or other period noted on the supply depot requisitions.

On requisitions for certain supplies the class designation would be shown as one item. For instance, on a requisition for "Medicines" we would have the one item, "Item (1), medicines," but would show that the class designation (for the purposes of the requisition) would include tablets, disinfectants, and medicines in addition to those listed on the Supply Table of the Medical Department. These are contingent (annual) requisitions—i. e., for supply as necessity arises. Relevant purchases may be made under authority of same through the local supply officer during the period stated on the requisitions. Where it is impossible to foresee the variety and approximate amounts of items required under any general class of supplies, a contingent (annual) requisition would be submitted. In the case of drugs and other staple supplies, the prices of which are subject to wide fluctuations, contingent requisitions are advantageous in that they enable the

depot to arrange for purchase of such supplies when market conditions are favorable.

Contingent (annual) requisitions would be submitted for the following classes of supplies:

Medicines, including tablets and disinfectants.

Surgical instruments and appliances.

Surgical dressings, etc.

Books.

Dental material.

As these requisitions were returned approved, the depot would request the local supply officer to make purchases of required supplies under authority of same. The supply officer would award the contracts for the required supplies in the usual manner and the successful bidders would proceed to make delivery as soon as they were in receipt of award.

For certain other supplies detailed requisitions would be submitted. Such requisitions would show for each item the amount required during the period stated on requisitions, general conditions with which bidders must comply (in regard to submitting of samples, delivery of supplies, etc.), and specifications for each of the items listed. When these requisitions have been approved the items listed thereon are, as a rule, placed on schedule by the Bureau of Supplies and Accounts. "On schedule" is a term peculiar to Navy supply nomenclature and refers to a list of items classified under a Bureau of Supplies and Accounts proposal or contract. In so far as they apply to medical supply depot practice, schedules are generally annual contracts, which are awarded in accordance with the recommendations of the commanding officer of the supply depot. Schedules generally bear a modifying clause to the effect that the Government reserves the right to order a certain per cent less or a certain per cent more than the quantities specified. The depot may obtain supplies listed on schedules by placing orders directly with the contractor as such supplies are needed. Where it is possible to foresee the variety and approximate amounts of items required under any general class of supplies a detailed requisition could be submitted, with a view of having such supplies placed on schedule. Placing certain supplies on schedule makes for economy, as the relatively large quantities called for tempt manufacturers to deal directly with the Government, thus eliminating the jobber's margin. Furthermore, the fact that schedules generally call for partial deliveries at extended intervals enables manufacturers to produce the required supplies at their convenience, in addition to their regular output for trade, with a consequent reduction in cost.

Detailed requisitions would be submitted for the following supplies, with a view to having them placed on schedule:

Hospital stores.
 Dispensary and laboratory equipment, etc.
 Hospital appliances.
 Bedding and linen.
 Caskets.

As the depot received notification of award of contracts on schedule from the Bureau of Supplies and Accounts orders would be placed directly with the contractors, who would deliver the required supplies within the time specified on their contracts.

Blank forms, prescription pads, and Journal of the Medical Department would be obtained on a request addressed to the Bureau of Medicine and Surgery.

Stationery, with the exception of prescription pads and Journal of the Medical Department, would be obtained from the local supply officer's stock on stub requisition.

Sundry articles for regimental and field outfits would be obtained by requisition on the local Marine Corps depot quartermaster, the local supply officer, and the Army field medical supply depot.

If desired, evaporated milk, pajamas, and various other articles could be obtained by requisition on the naval provision and clothing depot, New York.

The supply depot in question would be called on for annual issue of about \$3,000,000 worth of medical and surgical supplies under the present wartime conditions. If the depot were to be commissioned under these conditions special requisitions would be submitted to the Bureau of Medicine and Surgery for any indispensable items—such as gauze, for which the unprecedented military demand would promise to exceed the normal market supply—with a view of having such requisitions referred to the Council of National Defense. The council is enabled to arrange for the acquisition of such supplies for various Government departments through nation-wide coordination of manufacturing facilities, standardization of supplies, conservation of raw material for military purposes, and by other means at its disposal.

ANSWER TO (C).

On receipt of a supply depot request for purchase the supply officer would make copies of the supply depot request on proposal blanks and invite bids by forwarding the proposal blanks to acceptable, prospective bidders. The bidders fill in the prices, time of delivery, and other data called for by the proposals, and return the signed proposals or bids to the supply officer prior to the time fixed for the opening of bids. The bids are opened and recorded by the supply officer at the appointed time, and are then forwarded to the commanding officer of the supply depot for recommendation of award. Samples, models, blue prints, etc., submitted in connection with bids

PREPARATION OF MANUSCRIPTS FOR PRESS.

Manuscripts accepted and prepared for press are designated "Copy."

Copy must be on one side of the paper only.

Double spacing and margin are essential in copy in order to leave room for corrections or change and for adding directions to the printer.

Manuscript corrections should be made at the site of the error, whereas corrections of proof are indicated in the margin.

The sign "%" on the typewriter is for commercial correspondence. Every time the typist uses the sign to save himself time and labor he imposes on the editor the task of erasing it and writing in *per cent.*

Do *not* underline headings or captions as underlining is a direction to the printer to use *italics*. Leave ample space above and below all headings for the directions as to type, etc.

In most of our Government publications we follow precedent and established routine. Hence, it is well to look up the forms used in previous numbers or editions. Thus, after a title of a paper on the next line put "By," followed by *initials, name, title, and corps.*

The writer and *not* the editor should verify the correctness of the name and designation.

Do not fasten sheets of manuscript together by a fastener which can not be easily removed without tearing the paper.

Do not use the form of official correspondence by which two or three spaces are left between paragraphs. Parenthetical marks then have to be added by the person preparing the copy for press. Do not number paragraphs as a routine procedure, but only when this is to be indicated in the text.

Avoid the use of capitals. Insist on having a dictionary accessible at all times, and never write a word about whose spelling you are in doubt.

Look up a good many words about which you have no doubt, and you will get some new ideas about spelling.

There are usually two proofs of an article, the *galley* and the *page*.

Additions and changes in the galley have been corrected and the requested additions inserted in the page proofs. The corrections or additions made to page proof can not be verified, as the text is not seen again by the editor until the finished product is delivered.

The more inaccurate and careless the manuscript and the more numerous the necessary corrections, the greater the certainty of errors in the printed work, since a certain proportion usually escapes detection.

Do not use the word *corpsman* by itself. It means nothing. A man may be a member of Medical Corps, Hospital Corps, Marine Corps, or even of a duelling corps at a German university. Hospital corpsman, however, is definite and specific.

CONTRIBUTIONS.

Save your copy of the SUPPLEMENT and use it for reference. All information contained in its pages may not be of immediate value but may be just what you need at a later time. Each number contains information not found in the "Handy Book."

The contributions desired are articles dealing with measures and methods of treating the sick and injured, teaching and training, special duties, suggestions for improvement in any line of Hospital Corps work; pictures illustrating Hospital Corps activities; the corps on detached duty, on foreign stations, at training schools, landing parties, transportation of sick and injured, surgical X-ray and laboratory procedure, tropical duties, war pictures illustrating the work of the Hospital Corps; in short, any pictures which will be of interest and instruction to the corps.

The editor has been gratified by the interest already taken by hospital corpsmen and others who have submitted articles and pictures for publication in the SUPPLEMENT. It is hoped that the interest will continue and that hospital corpsmen, doctors, nurses, dental officers, will all remember that they can talk to one another in the pages of this publication in a way which will be of benefit to all.

Several contributions have been received which, because of limited space, could not be published in this number.

The SUPPLEMENT will publish only material that is of special interest and benefit to the Hospital Corps, the editor reserving the right to turn over to other Navy magazines or papers material which is of interest to the Navy at large, rather than to the Hospital Corps in particular. Owing to the uncertainty of mail transmission the editor does not assume responsibility for the return of pictures, articles, etc., contributed.

Endeavor will be made to answer through these columns any inquiries submitted by hospital corpsmen that are of general interest to the corps. Strictly personal inquiries will not be answered. Unsigned letters will not be considered.

Address all communications to:

EDITOR OF THE SUPPLEMENT,
*Bureau of Medicine and Surgery,
Navy Department,
Washington, D. C.*

CONTRIBUTIONS

The purpose of the SUPPLEMENT and use it for reference
contributions submitted in the pages may not be of immediate
use but be just what you need at a later time. Each number
of the SUPPLEMENT will be found in the "Library Book."

Contributors desired are articles dealing with nursing and
of interest to the sick and injured, teaching and training
of nurses, suggestions for improvement in any line of hospital
work, pictures illustrating Hospital Corps activities, the
equipment of ships or hospital stations at training schools,
the transportation of sick and injured, surgical X-ray
pictures, photographs, topical films, war pictures illustrating
the Hospital Corps in action, and pictures which will be
of interest to the Hospital Corps in short, any pictures which will be
of interest to the Hospital Corps.

Material has been credited to the Hospital Corps by
the Hospital Corps and others who have submitted articles and pic-
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Hospital Corps will assume responsibility for the return of pictures,
and the Hospital Corps.

Contributions will be made to return through those columns any in-
formation that is of general interest to the Hospital Corps.
Contributions of general interest will not be accepted. The
Hospital Corps will not be considered.

Contributions to the Hospital Corps

Editor of the Hospital Corps

Director of Hospital Corps

Army Department

Washington, D. C.